Engin.
Library
SIXTY-NINTH YEAR OF SERVICE TO THE METAL WORKING INDUSTRY

DEC 15 1933

CONTENTS INDEX PAGE 9

THE IRON AGE

PRODUCTION -:- MANAGEMENT DECEMBER 14, 1933 PROCESSES -:- NEWS

Lavino
FERRO
MANGANESE
78-82%
E. J. Lavino & Company

EXCLUSIVE SALES AGENTS
OGLEBAY, NORTON AND COMPANY
HANNA BLDG., CLEVELAND, O.
Pittsburgh Office: 1842 Oliver Building
Chicago Office: 208 S. LaSalle Street

OGLEBAY NORTON

SUPERIOR IRON ORES
ER NON-BESSEMER
IFEROUS HIGH PHOSPHORUS

OAL PIG IRON
Y SEMI-COLD BLAST

FLUORSPAR
ACID LUMP—98 & 1%
NO. 1 LUMP—95 & 1.50%
NO. 2 LUMP—85 & 5%
WASHED GRAVEL—85 & 5%
GROUND—ENAMELERS GRADE
95-98 & 2½%
GROUND—GLASS MAKERS GRADE
95-98 & 2½%

FERRO ALLOYS
FERRO-SILICON
NIAGARA BRAND—15%-50%-75%-85%
FERRO-CHROME
NIAGARA BRAND—HIGH AND LOW CARBONS
SPIEGELEISEN—LAVINO BRAND—19-21%
SILICO-SPIEGEL—NIAGARA BRAND
SILICO-MANGANESE—NIAGARA BRAND

FERRO-PHOSPHORUS
ROCKDALE BRAND—17-19%

PHOSPHATE ROCK
SPECIAL FURNACE SIZE

COAL
STEAM—GAS—BUNKER

CHARCOAL
WRIGLEY HARDWOOD
LUMP—BULK—BURLAP BAGS

HOT TOPS
"C&D"—FOR INGOT MOLDS

LAKE TRANSPORTATION
THE COLUMBIA TRANSPORTATION COMPANY

WATER FLOWS DOWN HILL

It is universally accepted that water flows down hill. Industry likewise has almost that same universal acceptance for Chromel-Alumel thermocouples and lead wire. The lead wires are made of the same alloy as the couple and thus eliminate all possibility of "compensation" error. The Chromel-Alumel has long life, with accuracy, up to 2000° F. Some companies use them at "high speed" temperatures. When the hot-end wears out, the couple can be welded at the other end and thus give prolonged additional service. The Chromel-Alumel couple does not need to be "packed" in its tube, which makes it sensitively responsive to temperature change. This couple is also noted for its uniformity of good behavior. It's not an "in and outer." These are the essential reasons why pyrometer users have almost universal acceptance for Chromel-Alumel couples and lead wire. With them, they get the most out of their pyrometer. . . . For technical data ask for Catalog HI.

Chromel

HOSKINS MANUFACTURING CO.
4439 Lawton Ave., Detroit, Mich.
In Canada: **Walker Metal Products, Ltd., Walkerville, Ont.**

HOSKINS

Chromel Couples

THE IRON AGE, published every Thursday by the *IRON AGE PUBLISHING CO.* Publication Office: N. W. Cor. Chestnut & 56th Sts., Philadelphia, Pa. Executive Offices: 239 W. 39th St., New York, N. Y., U. S. A. Entered as second class matter at the Post Office at Philadelphia under Act of March 3, 1879. $5.00 a year in U. S., Canada $8.50, Foreign $12.00. Vol. 132, No. 24.

THE IRON AGE — December 14, 1933

J. H. VAN DEVENTER, *Editor*
F. J. WINTERS, *Managing Editor*
G. L. LACHER, *Consulting Editor*
T. H. GERKEN, *News Editor*
R. E. MILLER, *Machinery Editor*
G. EHRNSTROM, JR., *Pittsburgh*
BURNHAM FINNEY, *Detroit*
GERARD FRAZAR, *Boston*
F. L. PRENTISS, *Cleveland*
R. A. FISKE, *Chicago*
A. I. FINDLEY, *Editor Emeritus*
L. W. MOFFETT, *Washington*
R. G. McINTOSH, *Cincinnati*

NRA MEMBER U.S. WE DO OUR PART

Contents

Readjustment or Redesign	11
Homogeneous Joints Produced by Welding	12
Small Shop Operating Costs and Profits	16
Making Automotive Piston Rings	18
Quenching Media in Hardening Steels	21
Finish Helps Metal Products Sales	22
Steam Locomotives Streamlined	26
New Equipment	27
News	29
Personals and Obituaries	31
Washington News	32
Automotive Industry	37
November Ingot Output	38
Markets	39
Construction and Equipment Buying	54
Products Advertised	80
Index to Advertisers	98

THE IRON AGE PUBLISHING COMPANY

F. J. FRANK, *President* G. H. GRIFFITHS, *Secretary* C. S. BAUR, *General Advertising Manager*

PUBLICATION OFFICE: N. W. Corner Chestnut and 56th Sts., Philadelphia, Pa.
EXECUTIVE OFFICES: 239 West 39th St., New York, N. Y., U. S. A.

Member, Audit Bureau of Circulations
Member, Associated Business Papers

Published every Thursday. Subscription Price: United States and Possessions, Mexico, Cuba, $6.00; Canada, $8.50, including duty; Foreign, $12.00 a year. Single Copy 25 Cents

Cable Address, "Ironage, N. Y."

ADVERTISING STAFF

Emerson Findley, 311 Union Bldg., Cleveland
B. L. Herman, 675 Delaware Ave., Buffalo, N. Y.
H. K. Hottenstein, 802 Otis Bldg., Chicago
Peirce Lewis, 7338 Woodward Ave., Detroit
Charles Lundberg, 45 Kent Rd., Upper Darby, Del. Co., Pa.
C. H. Ober, 239 West 39th St., New York
W. B. Robinson, 428 Park Bldg., Pittsburgh
W. C. Sweetser, 239 West 39th St., New York
D. C. Warren, P. O. Box 81, Hartford, Conn.

SEVENTY-NINTH YEAR OF SERVICE TO THE METAL WORKING INDUSTRY

Ten Thousand Sizes and Kinds of Steel Products Ready to Ship

—Large stores of steel and allied products that offer unusual possibilities for concentrating purchases and thus saving time, trouble and money. The diversity of stocks, the wide range of sizes carried, with prompt service assured, provides an economical source for those following the generally accepted hand-to-mouth buying methods.

There are ten Ryerson plants. Each plant is strategically located to serve its own industrial area. In every plant there is a strong, experienced organization with not only the desire, but the ability to serve.

You will find many advantages in grouping orders for immediate shipment from your nearest Ryerson Steel-Service plant.

PARTIAL LIST OF PRODUCTS ALWAYS IN STOCK

Bars	Turned, Ground and Polished Shafting	Babbitt Metal
Structurals	Strip Steel	Allegheny Metal
Rails	Rivets and Bolts	Alloy Steel
Plates	Boiler Tubes and Fittings	Tool Steel
Sheets, Blk. & Galv.	Welding Rods	Concrete Reinforcing Firmtread Plates
Sheets, Full Finished	Forging Bars	Small Tools
Refined Iron		Machinery, etc.
Screw Stock		

JOSEPH T. RYERSON & SON, INC., Plants at: Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Cleveland, Buffalo, Boston, Philadelphia, Jersey City

RYERSON STEEL-SERVICE

The "Key" to Immediate Steel—

The Ryerson Stock List gives you quick, direct reference to data on practically all steel lines. Use this data book for quick reference in purchasing your current steel requirements.

If you do not have the Ryerson Stock List, mail this coupon, and we will be glad to forward a copy.

Name.....

Firm.....

Street.....

City.....State.....

▲▲▲ THE IRON AGE ▲▲▲

DECEMBER 14, 1933

ESTABLISHED 1855

Vol. 132, No. 24

Readjustment or Redesign?

MECHANICAL experts have learned the necessity of distinguishing carefully between readjustment and redesign. A lack of appreciation of this difference has often proved costly.

Readjustment of a mechanical product to meet new conditions or demands is a normal symptom of alertness and progressiveness that is recognized as necessary, though to be undertaken always with care and with skill. Redesign, in which basic and radical changes are made in a complicated mechanism, is a far more serious matter. It is one to be approached with extreme deliberation. We have all seen the serious business consequences of hasty redesign. Many such a hopefully conceived but premature brain child has died aborning, leaving a big doctor's bill to pay.

If this discrimination between readjustment and redesign is so vitally necessary in the mechanical fields, is it not even more necessary with respect to the far more complicated and delicate economic mechanism?

We are assured that the new machine that is being built for us by our hastily summoned social mechanics will operate much more smoothly and safely than the old one that we have been using for so many years, and from what is going on it appears that it will be a rather complete redesign, not simply a readjustment.

Shouldn't the customers who must pay the bill be given a chance to examine the blue-prints?

Homogeneous Joints Produced

By EVERETT CHAPMAN
Vice-President in Charge of Engineering
Lukenweld, Inc., Division of Lukens Steel Co.,
Coatesville, Pa.

THE science of structures is concerned with the economic distribution of elastic material to connect a load to its reactions over a reasonable length of time. Intimately associated with this broad subject are the various methods used to join the component members of the structure.

While the physical properties of elastic materials and the engineering details of their distribution are important factors, this paper is primarily concerned with the production of ideal joints.

Any structure built of pieces must necessarily act as a whole under its applied loads. Joint efficiencies, therefore, determine the action of the structure. As the unit stresses are raised, high joint efficiencies become increasingly important. As the loading cycle becomes more and more frequent, homogeneous joints become imperative.

Property welded joints are more nearly homogeneous than any other type of connection between two pieces of material. Homogeneous joints are eminently desirable since they particularly affect the rigidity and fatigue performance of the structure.

Two Methods of Supporting a Load

Consider the two methods of supporting a load over a span, as exemplified in Fig. 1. The usual truss and abutment arrangement is essentially a three-piece structure, connected by pin joints. The rigid frame bridge is a one-piece structure in which the transition from horizontal to vertical members is distinguished by the fact that this apparent joint can transmit bending moments. In the one-piece rigid frame bridge, the bending moments are distributed uniformily over the entire structure. The vertical and horizontal members interact to redistribute the bending moments. When, as in this case, adjacent members interact through a rigid junction, the redistribution of bending moments may effect an economy of material running as high as 30 per cent. Considered broadly, the type of joint at the knee of the one-piece rigid frame bridge is the joint inherent in a properly welded design.

Two plates can be welded together so that the joints, as such, vanish. A homogeneous joint, or transition between two pieces of material, is a joint whose elastic behavior cannot be distinguished from that of the same configuration cut from a single piece of material. In the unattainable ideal, the maximum stress would have the same value as the average stress. It is thus indicated that a definite though intangible advantage continually permeates the welded steel structure. Since the joints can be made so that the continuity of rigidity is perfectly preserved in the transition from one member to another, the structure will act as an elastic entity. That this ideal can be closely approached in welded joints has two implications for the structural designer.

Welded Design Adapted to Curvilinear Structures

First, as has been mentioned, is the fact that continuity can be taken into consideration in the design of gross structures such as bridges and buildings in which the moment of inertia of each member is much less than the corresponding constant for the whole structure. Welded design is eminently adapted to the curvilinear structures which result when continuity of elastic action is considered in the design. The second implication is that the behavior of the properly welded structure, under impact and fatigue load, is similar to that of a jointless structure as far as service life is concerned. The entire structure's resistance to severe loading conditions represents the thoroughly consolidated resistance of its components.

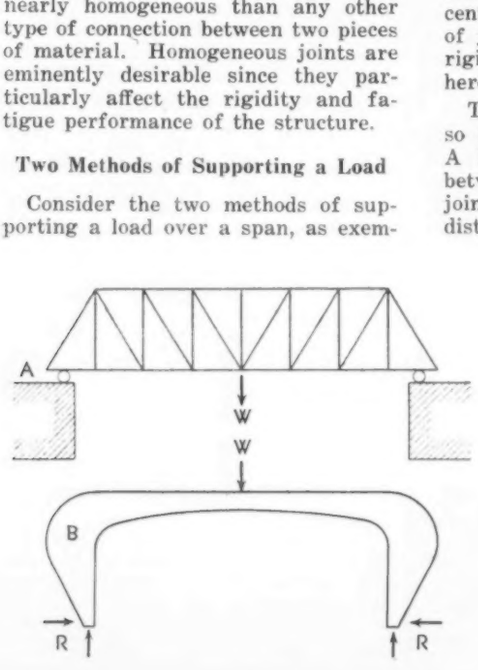


Fig. 1—(At left) Two methods of supporting a load over a span. The usual truss and abutment arrangement is essentially a three-piece structure, connected by pin joints. The rigid frame bridge is a one-piece structure.

Fig. 2—(At left) Heterogeneous stress condition existing in an improperly designed welded joint.

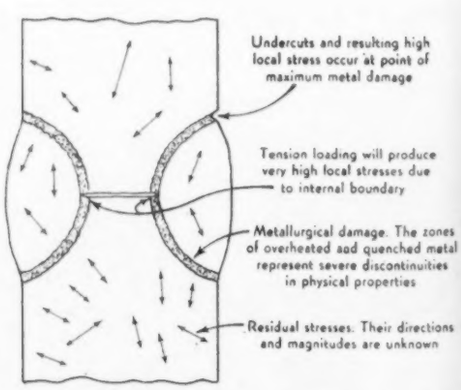

Undercuts and resulting high local stress occur at point of maximum metal damage
Tension loading will produce very high local stresses due to internal boundary
Metallurgical damage. The zones of overheated and quenched metal represent severe discontinuities in physical properties
Residual stresses. Their directions and magnitudes are unknown

Fig. 3—(Above) Sketch showing what can result from the improper execution of a welded joint. Physical properties are not uniform and stress values of the joint when loaded vary greatly from point to point.

By Welding ▲ ▲ ▲

THE increasing importance, to the structural designer, of homogeneous joints, the elastic behavior of which cannot be distinguished from that of the same configuration cut from a single piece of material, and the superiority of properly welded joints from the standpoint of homogeneity are outlined by Mr. Chapman in this paper, presented at the annual meeting of the American Society of Mechanical Engineers in New York last week. Factors that control the production of homogeneous welded joints and finally the correction of destructive factors in non-homogeneous joints are discussed at length.

A homogeneous joint has two characteristics. First, the material comprising the joint must have uniform physical properties from point to point; it must not have been damaged in any respect by the fabricating process. Second, the distribution of stress throughout the joint, from point to point, should be of maximum uniformity. Perfect distribution of stress over the joint is also an unattainable ideal since the joint, at its best, represents an abrupt change in contour.

With a homogeneous joint of the desired characteristics, the two members are joined in such a manner that neither the elastic action nor the plastic action of the composite is distinguishable from the action of a single piece. Again, the joint has vanished.

Factors Controlling Production of Homogeneous Welded Joint

Three factors control the two desired characteristics of the homogeneous welded joint.

First, the parent metal is damaged by the extreme heat of the welding operation. The transition zone between weld metal and 0.40 per cent carbon base metal is shown at the left of the "as welded" designation in Fig. 7. The large grain size is indicative of the high temperature to which the parent metal has been raised by the heat of the arc. The metallic heat path to the body of cold parent metal forms an excellent thermal sink and the resulting rapid heat flow away from the weld thoroughly quenches the heated zones around the weld. The net result is a zone of highly overheated and quenched material adjacent to the weld. The severity of damage in this zone is a particular function of the carbon content of the parent metal, or more generally, a function of the air-hardening ability of the steel.

This damaged zone, whatever its extent, represents a discontinuity in physical properties, since the large, overheated grain is decidedly weak in resistance to fatigue and impact. In addition, the hardened micro-constituents, due to the quenching action, are very strong, but they lack the ductility necessary to compensate for the thermal stresses to which the piece is subjected in the welding operation. The joint may crack through the damaged zones during fabrication. This phenomena may be carried over into the service behavior of the structure if the damage is not corrected.

Effect of Improperly Designed Joint

Second of the factors controlling the production of homogeneous welded joints is the design of the joint itself. It is the rule rather than the exception that stress concentrations of a very severe nature may exist in the joint. Fig. 2. shows the heterogeneous stress condition that exists in an improperly designed welded joint. This photoelastic study represents a loaded butt joint between two pieces of metal of equal thickness. The two welds, deposited from each side, did not meet at the center. The unfused portion forms an internal boundary which produces an extreme variation in stress over the joint. At the end of this crack, the stresses are very high. In addition, intermediate high stresses exist at the ends of the reinforcements which are usually, and vainly, applied in order to strengthen this type of joint. Such reinforcements are effective only under static load. But under impact or fatigue loads, the changes in contour at the ends of the reinforcements introduce additional stress maximums.

Influence of Residual Stress

Third of the factors influencing the production of homogeneous welded joints is the element of residual stress introduced in the structure through contraction of cooling weld metal. Little is known of the direction or magnitude of these thermal stresses. However, there is direct evidence that the residual stresses, in many cases, may exceed the yield point of low-carbon steel. When a known service load is superimposed on a structure which is already loaded by residual stresses in an indeterminate manner, the elastic conditions which exist from

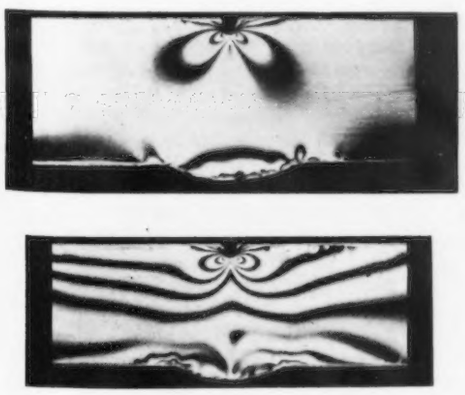


Fig. 4—Stress distribution usually found in a weld made from one side of a plate. Such welds frequently introduce ragged contours.

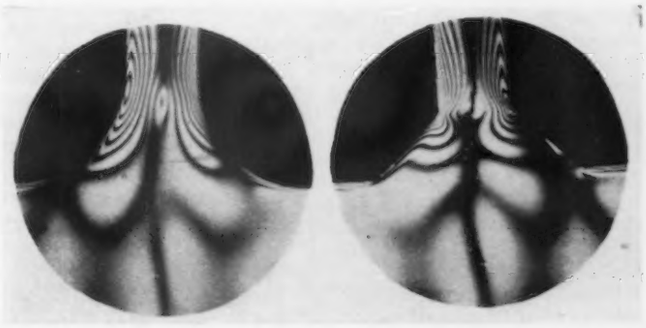


Fig. 5—Comparison of stress conditions around a fillet weld having a concave contour with that around a fillet weld having a triangular cross-section. The concave throat contour provides the most uniform distribution of stress.

point to point are highly chaotic. The structure may be so highly preloaded that its permissible load in service is only a small fraction of the designed load. Structures, the natural shapes of which are such that the stresses are self-locking, often fail through the partially completed welds during fabrication, due to some shop handling condition (such as hammering or dropping) which applies even a small shock load to the structure. This behavior is not due to "brittle welds," as has been commonly supposed.

In addition to the elastic chaos that residual strains may produce in a welded structure, severe warping will occur when the strains are relieved, either in the machining operation or by a gradual creep over a period of time. A battery of machines in which proper functioning depended upon maintained accurate alinement was rendered progressively ineffective as the machine housings gradually crept out of shape. In two years, the machines were useless.

Non-Homogeneous Joint From Improper Welding

Fig. 3 represents graphically what can result from the improper execution of a welded joint. This joint is far from homogeneous. The physical properties are not uniform from point to point, as there are zones of badly damaged metal. The stress values throughout the joint, when loaded, vary tremendously from point to point, because, in addition to the stress concentrations which exist at internal and external boundary discontinuities, the unknown residual stresses add to the concentrated load stresses, and thus produce utter chaos. Note the points of extreme stress concentration at the ends of the internal boundary, the points of lesser stress concentration at the ends of the reinforcement and around the undercut. Zones of badly overheated and quenched parent metal surround the weld metal. The situation is further aggravated by the coexistence of damaged material and high stress at the same place. The undercut localizes a high stress at a point where the parent material is in its poorest condition.

Whenever a welded joint, whatever its type, functions in a non-homogeneous manner, one or more of three destructive factors are operating—sharp changes in contour, damaged material, and preloading. For example, Fig. 4 represents a stress distribution usually found in a weld made from one side of a plate. Such welds frequently introduce ragged contours, since the form of penetration of the weld metal cannot be completely controlled from one side. Where the design of the structure is such that welding from both sides is impracticable, the use of backing-up strips permits the production of a compromise contour which is at least predictable.

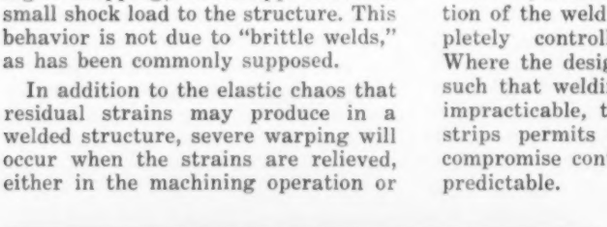


Fig. 6 — Bad stress distribution resulting from an unwelded internal boundary on a ductile and on a brittle weld metal.

Another common type of defect is overlap, which often occurs at the hands of an inexperienced welder. It is caused by running over of the molten weld metal on to the surface of the plate, where it merely solidifies instead of fusing with the parent metal.

Concave Throat Contour Best

Fig. 5 shows another of the many forms of vicious stress distribution that may creep into a structure. It contrasts the stress conditions around a fillet weld having a concave contour with that around a fillet weld having a triangular cross-section. Although having a lower average stress due to its greater throat dimension, the triangular throat weld has higher maximum stresses because of the abrupt change in contour that it represents. The concave throat weld has a smaller throat area and therefore possesses a higher average stress, but its points of maximum stress are considerably lower than those in the triangular throat weld.

There are many instances permeating the entire machine design picture in which the proper procedure to rectify a succession of fatigue failures is to remove metal rather than make an addition to the existing section. The effect of removing metal properly is to raise the average stress a few per cent while making a reduction of several hundred per cent in the values of the maximum stress. The concave throated weld fillet is a case in point. The concave throat contour provides the most uniform distribution of stress and is the closest approach to the ideal that can be obtained in practice. The conventional term, throat dimension, has no meaning in this case since the technique involved in removing the internal boundary consisted of welding completely through the joint.

Fig. 6 contrasts the action of the poisonous stress distribution resulting from an unwelded internal boundary on a ductile and on a brittle weld metal. The ripping action which starts from the inside reduces the apparent strength of this joint materially. The brittle weld metal shows a fracture without an attendant change of shape while the ductile material, through a plastic deformation at the points of high stress, enables the structure to change its shape to a degree that materially raises the actual strength of the joint.

Prevention of Non-Homogeneous Joints

Correction of the destructive factors which are present in non-homogeneous joints revolves around two elements, namely, drafting room practice, and heat treatment.

As it is concerned with the design of the joints, drafting room practice must be carefully supervised to insure that none of the defects discussed are allowed to creep into the structure. Design practice can no more afford to neglect the stress distribution in the joint than it can afford to neglect the stress distribution throughout the gross body of the structure. In fact, the problem is more acute in the case of the joints, simply because the variables entering into the production of a joint are less standardized than those which enter into the manufacture of the steel plate. The effect of a notch in breaking brittle material under a single load is only too well known in the case of the age-old method of breaking glass. The equivalent effect in a ductile material is not marked when the load is applied only once. But the exact effect is duplicated when the load is of a repeated nature. It is astonishing that, in view of this fact, notches as a species do not seem to be generally recognized. It is only a notch in a particular form which has caused trouble that receives any recognition. It is well known that prick punch marks and scriber marks and stamped initials must not be applied to locomotive or airplane components. Just why the identical phenomena, in the shape of undercuts and unwelded boundaries and triangular weld contours, are blissfully incorporated in high-duty welded structures is difficult to explain. It is, however, the reason why welded steel structures have failed.

Correction of damage to parent metal necessitates a heat treatment after the structure has been welded. The series of photomicrographs, shown in Fig. 7, illustrates the effect of welding, stress, relief, and treatment at the two critical temperatures, of two pieces of steel of different carbon content. All of the photographs were made at 100 diameters, and etched with nital. The first picture represents the as-rolled condition of 2-in. plates, all the others were taken on the very edge of the weld metal and illustrate the effects which occur in the parent metal.

In the as-welded condition, it is seen that the parent metal in the case of 0.40 carbon steel is in a martensitic condition, while the 0.24 carbon steel shows evidence of the original austenite with troostite forming at the grain boundaries. It is to be noted also that the grain has been enlarged considerably. The probable characteristics of these two zones are extreme brittleness, no ductility, and a general weakened condition due to the large grains. With such characteristics, these zones cannot absorb any energy, as they would be called upon to do in the case of an impact; furthermore, they have no self-relieving properties under thermal stresses because of their lack of ductility.

Effect of Stress Relieving at 1200 Deg. F.

The effects of the usual stress-relieving treatment at 1200 deg. F., followed by a furnace cool, are illustrated in the third group of two pictures. A temperature of 1200 deg. F. is usually considered sufficient for stress-relief, since at this, ordinary low-carbon steels have a yield of only about 2000 lb. per sq. in. This means, of course, that any residual stress greater than 2000 lb. per sq. in. will produce plastic deformation and will, therefore, vanish for all practical purposes. The preloading introduced by the contracting weld metal has been removed. The 1200 deg. F., however, if held for a proper length of time, will serve to break down the harder microconstituents which are formed in the damaged zones. But it will not refine the grain, since the carbon does not go back into solution at this temperature. It is also to be noted, then, in third group of two pictures delineating the 1200 deg. F. treatment, that the martensitic and troostitic phases in the two steels have been broken down to what is probably a finely divided sorbite, and it is reasonable to suppose that the residual stresses after this treatment are under 2000 lb. per sq. in.

Experience indicates that welded structures that have received this treatment will retain their shape during machining and indefinitely thereafter. Treatment at 1350 deg. F. partially refines the grain, while the treatment at 1650 deg. F., followed by cooling in still air, represents the maximum degree of refinement that can be obtained. This ideal, in which the pearlite and ferrite are in the finest possible condition, is hardly practical since most welded structures could not be removed from the furnace at this temperature without incurring a severe distortion. In fact, furnace cooling from 1650 deg. F. is rarely practical since lightweight, high-duty structures may suffer severe distortion in the furnace due to their own weight.

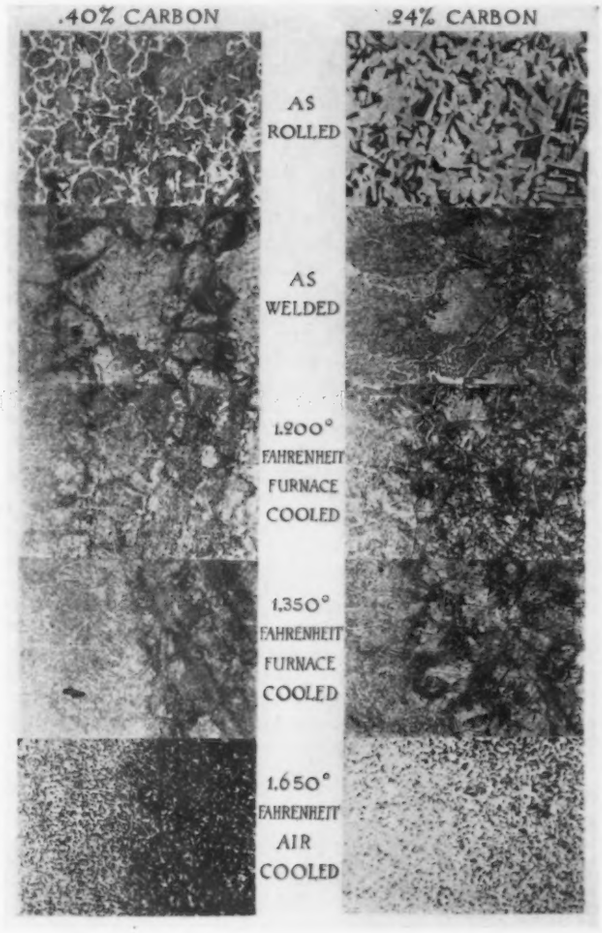


Fig. 7—Series of photomicrographs showing the effect of welding, stress relief, and treatment at the two critical temperatures, of two pieces of steel of different carbon content. All photographs were made at 100 diameters.

The practical compromise that represents the best commercial practice is, therefore, a soaking treatment for 1 hr. per in. of maximum thickness at 1200 deg. F., followed by a slow furnace cooling. Under more rigorous service conditions a gain can be practically effected by raising the temperature to 1400 deg. F., at which the grain undergoes partial refinement.

Important to Keep Carbon Low

The importance of keeping the carbon content of the steel in the lower ranges is graphically represented in the series of photomicrographs. The local damage done to the higher carbon materials more than offsets the higher average properties which they represent. The magnitude of the brittle phases which are present is a function which increases rapidly as the air-hardening ability of the steel is increased. In the case of the carbon steels, this is, of course, a function of the carbon content. It is through specifications of carbon content that the welding of large structures such as bridges and ships, which cannot be annealed in a furnace, will become practicable. However, even where metallurgical damage has been minimized in this manner, the problem of stress relief is not solved. As more is known of the nature of residual stresses, mechanical peening will offer a compromise solution which will enable the full possibilities of welded construction to be realized by the designer.

As the service duties increase and more and more is demanded of the available structural materials, the factor of safety must be reduced. Modern transportation trends are imposing high duties on available structural materials. Careful design and selection of materials are the only path to uniform-stress, one-piece structures. In such structures, the joint as an entity must vanish. The behavior of a properly made welded joint under any kind of load or load cycle cannot be distinguished from a single piece of rolled steel.

Small Shop Operating

WHEN American manufacturing is mentioned, the average person generally calls to mind the huge plants containing acres of floor space and a maze of intricate machinery for the production of motor vehicles, electric household appliances, agricultural implements, electrical power equipment, steel sheets and bars, railroad rolling stock, and the one hundred and one other products of huge metal manufacturing enterprises of which every industrialist is justly proud. As for the little shop employing from 10 to 50 men, we are inclined to smile indulgently when these are mentioned, but we seldom give them more than a passing thought. However, these small shops play an important part in our industrial system. They furnish quick service that could not otherwise be had, represent an aggregate investment of millions of dollars and give employment to thousands of highly skilled mechanics. They form an integral unit of our present day manufacturing system and they are here to stay.

When properly managed, the small shop can be made to show an excellent profit on the capital invested. When poorly managed, the owners often are at a loss to know whether or not they are making a profit. Any business should be conducted to earn a reasonable profit on the capital invested, but this is not possible without common-sense management. It is not uncommon to find small shops carrying a substantial book value in equipment where the owner keeps no books. His hip pocket is his bank. If he needs supplies he calls up a dealer, gives a telephone order, and when the supplies are delivered he pays cash. He meets his payroll in the same manner. When the bank roll is heavy all is well. When the stock of cash is scanty something is wrong. Such a man generally cuts prices to gain business and thereby he makes the matter worse. In other small shops, books may be kept after a fashion, usually a day book in which the owner scribbles receipts and disbursements (when he thinks of it) while bills are speared over a file hook to be paid "sometime later." Such shop owners know little about costs, profits, depreciation, etc., and how they figure the taxes due Uncle Sam is more or less a mystery.

Table I—Operating Expense

1—Rent, heat, light, power, supplies, maintenance	$2,700.00
2—7 machinists @ 75c. per hr. 2000 hr	10,500.00
3—3 laborers @ 40c. per hr. 2000 hr	2,400.00
4—Salary of shop superintendent	3,600.00
5—Office payroll	3,000.00
6—Office supplies, etc	100.00
7—Taxes, insurance, incidentals, etc.	600.00
8—Advertising	600.00
9—Owner's salary	5,000.00
Total	$28,500.00

Nothing Mysterious About It

There is nothing mysterious about small shop management. The entire problem is simple and the object of this article is to outline briefly a simple system that will enable any small shop owner to know just where he stands at any time. Let it be assumed that John Brown owns a small machine shop. His investment for equipment is $10,000.00, and his shop has the facilities to work ten men. The first step is to draw up a schedule as shown in Table I. This schedule has nothing at all to do with profits as that is taken up later. On the other hand it is devoted entirely to operating expenses. The shop is on a 40-week basis and, taking a 50-week year as an average, each man works 2000 hours a year or 20,000 hours for the entire shop's crew.

Item 1 is self explanatory and somewhat flexible to provide for emergencies that may arise from time to time. Items 2 and 3 constitute the shop payroll and they are the only items that do not fall in with overhead expense. Item 4 is the shop superintendent's salary, while item 5 is the office payroll. The figure $3000.00 is supposed to pay an office manager and a bookkeeper-stenographer. Item 6 takes care of printed matter and other office supplies. Item 7 is somewhat flexible, but the taxes are local only as Uncle Sam's share comes from profits. Item 8 is important as it permits a certain amount of local advertising which is absolutely necessary for any business. Item 9 is the owner's salary to which he is, of course, justly entitled. However, his salary must be within the bounds of reason or Uncle Sam will investigate. Should the owner of a small shop working ten men pay himself a salary of $15,000.00 for example, Uncle Sam might consider this unwarranted for the business and therefore make Mr. Brown pay a tax on it as profit. Generally with the small shop, however, it works the other way. That is to say, the owner takes "what is left" and calls that his salary.

The Hourly "Break Even" Cost

Now comes the most important factor in the entire setup. Mr. Brown is working ten men 2000 hours each per year of a total of 20,000 man hours.

Table II—Machine Cost

80 hr. labor (with overhead) @ $1.42½	$114.00
Stock	26.00
	$140.00
To make a profit of 200 per cent on initial investment of $10,000 must add to above.	$80.00
100 per cent	40.00
50 per cent	20.00
25 per cent	10.00
10 per cent	4.00
6 per cent	2.40

He divides his operating cost as shown in Table 1, $28,500.00, by 20,000 and he thereby finds that he must make $1.42½ for each man hour to break even. This is a somewhat unpleasant hard and fast rule pertaining to business that cannot be slighted. That is, wages are not only paid, but they must be earned if the business is to survive. No profit is shown

Costs and Profits ▲ ▲ ▲

By FRED B. JACOBS

by earning $1.42½ for each man hour. Mr. Brown has his salary of $5000.00, to be sure, but he has not made one cent on his investment of $10,000.00. He is at least entitled to a six per cent return, or $600.00. Of course, his salary of $5000.00 is 50 per cent of his initial investment. Here is where many small shop owners make a mistake. As long as the business pays a return in the form of a salary they are satisfied. However, do men habitually invest $10,000.00 for the privilege of making a $5000.00 salary? A good business man does not. Mr. Brown is certainly entitled to a profit besides his salary.

Overhead expense has much to do with profits because where the overhead is high, profits are shaved to enable the shop owner to live in a competitive market. Mr. Brown's overhead is moderate. It is $15,600.00 a year (total cost less shop payroll) or 54.7 per cent of his total expense of $28,500.00. No large business could possibly exist under such a small overhead. With the large plants, employing thousands of men, overheads from 200 to 300 per cent are not uncommon.

Mr. Brown makes a type of machine used by bakers and confectioners. The stock for one machine costs $26.00 and it takes 80 man hours to complete a machine. As it takes 80 hours to make one machine, in the working year of 20,000 hours 250 complete machines will have been turned out. Table II gives data on costs and profits. Just a word about the profit. The machine cost $140.00. To figure the profit on that cost is wrong. Profit must be figured on the shop investment of $10,000.00 and on that alone. Bear in mind that the cost of the machine, $140.00, takes care of all operating expenses. Also note that the overhead is figured in with the labor cost as it should be. Also the cost of stock is figured in at actual cost.

SMALL shops, employing from 10 to 50 men, play an important part in our industrial system. They have their competitive advantages, just as do the large plants, but these are of a different kind.

The chief factor of success, in the small plant, is the realization of its competitive advantages and the utilization of them. Both of these require straight thinking with regard to costs and profits. Mr. Jacobs' article will help this sort of thinking.

Determining the Profit Margin

In setting a selling price, the usual procedure it to get as much as possible. That is human nature. High prices often can be obtained for essential machinery covered by strong, basic patents but the line of machinery in question is not patented; anyone can build them. Thus if Mr. Brown desired to make a 200 per cent profit on his original investment of $10,000.00 his competitors might get the business—and they probably would. Again, a 6 per cent profit looks small, and it is. Thus the selling price must be governed by market conditions. Referring to Table II it is shown the amounts that must be added to the machine cost, $140.00, to make profits on the original $10,000.00 investment of 6, 10, 25, 50, 100 and 200 per cent. Suppose Mr. Brown is satisfied with a 100 per cent profit on his $10,000.00 (he had better be). His yearly output of 250 machines would bring a profit of $10,000.00 inasmuch as he makes $40.00 profit on each machine. It is evident that this is the gross profit only, since depreciation and Federal taxes must be deducted. After these items are substracted the remainder represents net profit. However, for the purpose of this article the gross profit will suffice.

As time goes on Mr. Brown's competitors begin to take business away. Mr. Brown can do one of two things. He can let the business "slide" or he can take means to reduce his production costs and thereby compete successfully. He decides to follow the latter course. He invests $10,000.00 is jigs, special tools, etc. This is a big investment for Mr. Brown's little shop. It means that he has increased his investment by 100 per cent. However this investment pays as shown in Table III. Here it is shown that he has cut his labor cost just one half as 40 hours of labor, with overhead, at $57.00 completes one machine. He now can make 500 machines a year. A 200 per cent profit on his capital adds $40.00 profit to each machine. On 500 machines he nets a profit of $20,000.00. Thus his special tools are paid for in the first year and he has made a 100 per cent profit on his original investment. His margin of profit is very satisfactory so that he will experience no further trouble in keeping in the market with his competitors. He could cut his selling price if he had to and still make a good profit.

As the above outline of procedure is a general one it will not fit each and every individual case, but it will serve to show what should be done in determining costs and profits. Briefly summarized the procedure is as follows: First, determine the operating cost as accurately as possible as outlined in Table I. Second, always add the overhead into the labor cost. Third, add a reasonable profit figured on the initial investment in the business. Fourth, and most important of all, use jigs and special tools wherever possible to reduce the cost of expensive manual labor.

Table III—Machine Cost

40 hr. labor (with overhead) @ $1.42½	$57.00
Stock	26.00
	$83.00
To make a profit of 400 per cent on initial investment of $20,000 must add to above.	$80.00
300 per cent	60.00
200 per cent	40.00
100 per cent	20.00
50 per cent	10.00
25 per cent	5.00
10 per cent	2.00
6 per cent	1.20

Manufacture of Automotive Piston Rings—II

By JOSEPH H. CHEETHAM
Factory Manager, Chance Co.

THIS is the second of a series of three articles describing the modern manufacture of automotive piston rings. The first installment appeared in last week's issue of THE IRON AGE.

In this article, Mr. Cheetham describes the foundry practice involved in quality control. A succeeding chapter will deal with machining.

REGARDLESS of the foundry equipment or the efficiency of the personnel, high quality piston rings cannot be made unless the finest raw materials obtainable are used. The laboratory must be operated by an experienced metallurgist and trained assistants. It must exercise accurate control of each element entering into the manufacture of piston rings. Control is had by analyzing the elementary factors of raw materials through chemical and physical procedure which includes the proper combustion from coke and air. Each cupola charge is figured and rechecked to insure adherence to normal standards.

Bearing in mind that piston rings must have high elasticity and be free from hard spots (chills), porosity and brittleness, still they must be softer than specified cylinder hardness and yet give long life. Having these requirements in mind, the Chance Co. demands an entirely different mixture for each different cross section piston ring, so that each size ring will carry the same modulus of elasticity. Typical analysis of 3/32-in. width rings of any diameter is as follows:

	Per Cent
Pure iron	91.50 to 91.86
Silicon	3.30 to 3.35
Phosphorus	0.50 to 0.55
Manganese	0.60 to 0.70
Total carbon	3.70 to 3.80
Sulphur	0.04 maximum

Metallurgists will realize that the most exacting requirements are necessary to control the final analysis of this mixture. In fact, it was but a short time ago that it was thought such accurate control was unobtainable.

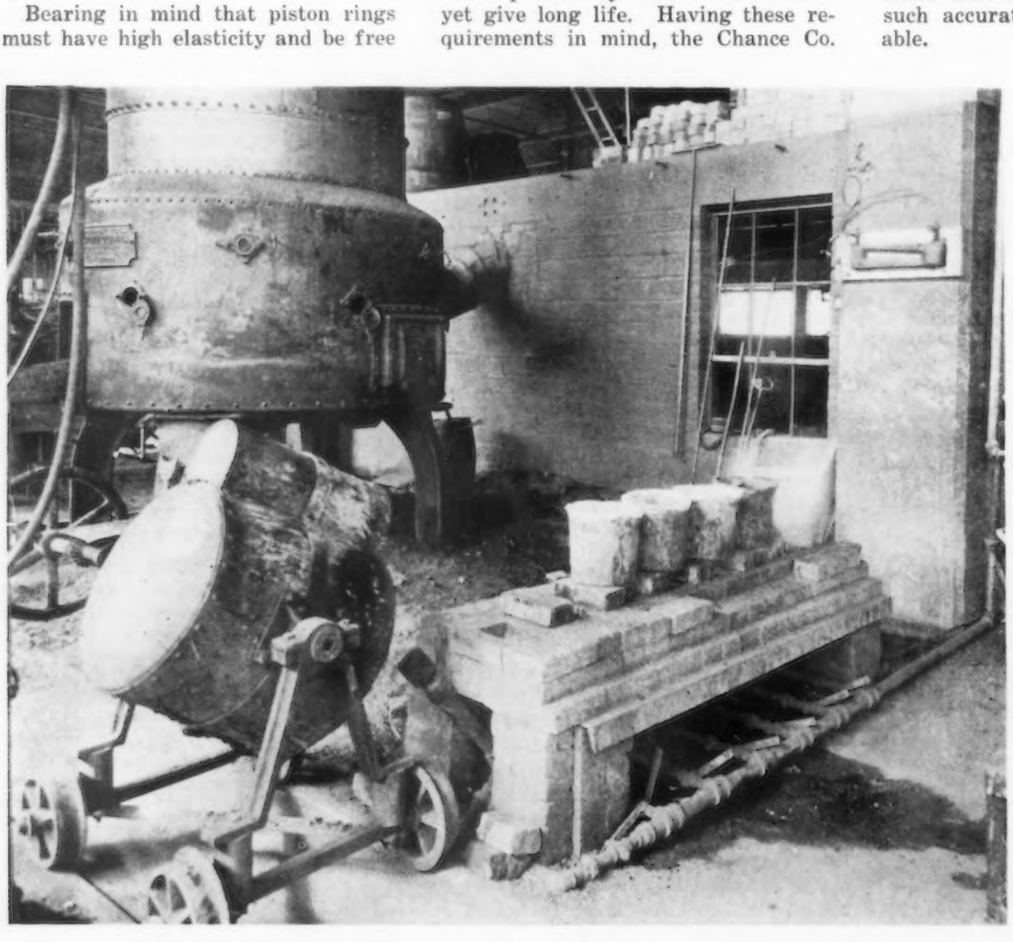


Fig. 10—A variation of not more than 100 deg. is permitted in pouring. Pouring ladles are preheated on a natural gas stove.

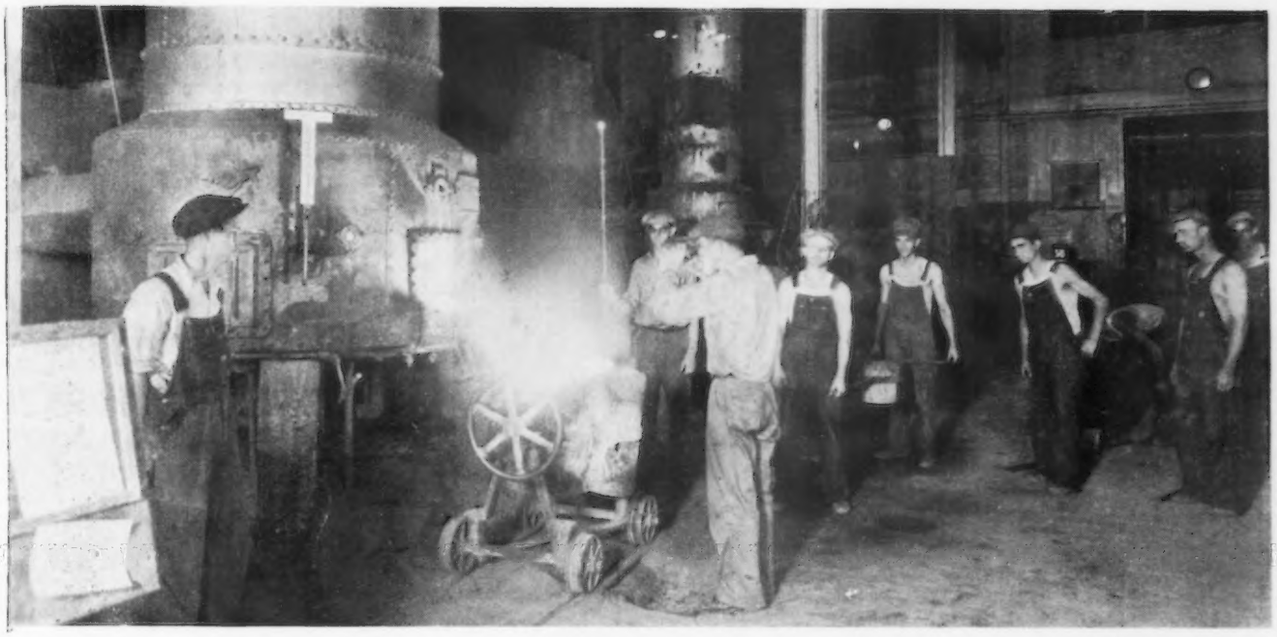


Fig. 9—A different mix is used for each different cross section of ring. And cupola operation, in addition to blast preheating, is regulated by manometers and optical pyrometers.

One of the hardest foundry practices to develop through scientific research and development work was the control of carbon and silicon. This involved expert foundry supervision to obtain a dense and uniform distribution of graphitic carbon (which insures softness) in the metal in order to get a close grained, homogeneous, pearlite matrix, which contributes to long life.

Eutectic segregation (caused by improper fluxing—improper mixing and improper pouring temperature control of the metal) must be eliminated. Failure of any one of these practices will cause the sulphur to be held in solution as manganese sulphites. This causes hard spots which reduce the elasticity, and oxidation which causes pin or blow holes.

Through laboratory tests it was found the moisture content in the atmosphere was from two to ten grams of water per cu. ft. of air according to the season. When it is considered that approximately 15,000 cu. ft. of free air is blown into the cupola every minute to give a proper combustion with the carbon in the coke, there are between 50 and 200 gal. of H_2O entering the cupola during a heat—some of which, if not properly controlled, will affect the resulting iron; therefore, preheated air is blown into the cupola in a large volume at low compression. Volumeters and manometers, which register compression of air in tenths of ounces, are used to gage the maximum and minimum control of air throughout the heat.

The operation of the cupola is chiefly a process of combustion in which the carbon in the coke and the oxygen in the air are used as fuels for melting the iron. It is well known that proper combustion is one part of carbon which is in the coke and two parts of oxygen which is in the air.

Transposing volume to weight calculations the formula becomes $12C + 16O + 16O$, or $12C = 32O$

$32 \div 12 = 2.66$ times as much oxygen as carbon.

Since air contains by weight approximately 23.1 per cent of oxygen, the air required for perfect combustion of each lb. of carbon in the coke is $2.66 \div .231$ cu. in. which equals 11.517 lb.

Carbon percentage in coke varies

Fig. 11—Piston rings are cast in clusters or trees. This effects economy of floor space as well as reducing remelt percentage.

Fig. 12—After the rings are broken from the sprue, gate marks or protuberances are removed by hand grinding.

according to the source and averages with the Chance Co.'s specifications about 92 per cent. With a proper CO_2 combustion each lb. of carbon in the coke burned will give 14,550 heat units (Btu). To insure proper pouring temperature necessitates experiment with the right amount of iron to be used with a certain amount of coke. In the piston ring manufacture the average requirement is one lb. of coke to melt 5 lb. of iron at a proper pouring temperature.

Having the proper metal analysis in the cupola and proper combustion control, there was yet required further refinement on cupola operation in that each charge must be properly mixed in the cupola after it is melted. It must also be tapped at the proper temperature and remixed in a mixing or "bull" ladle outside the cupola before being distributed to the mold.

No metal is poured into any mold unless it averages between 2650 and 2750 deg. F. Metal poured at this temperature range insures a minimum amount of misrun castings and prevents excessive steaming of sand in the mold. The temperature is constantly gaged through an optical pyrometer during the tapping process.

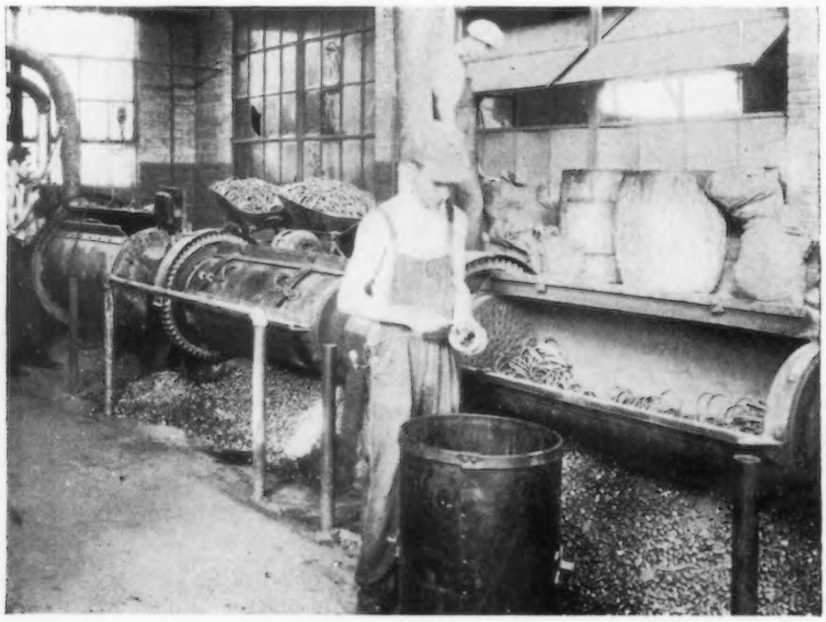


Fig. 13—Before machining, the snagged rings are tumbled and inspected.

Before the metal is poured from the "bull" or mixing ladle outside the cupola, the pouring ladles, which are lined with a high-temperature fire-resisting clay, must be heated to a temperature equal to that of the iron. This will keep to a minimum the reduction of temperature of the iron tested at the spout compared with its final pouring temperature into the mold. To accomplish this, the Chance Co. has installed a unique ladle drying apparatus, this is operated by natural gas rather than oil so as to eliminate any chance of picking up sulphur.

Specially designed molding machines were made to insure accurate and uniform sand-squeezing pressure. This allows the sand to free itself of gases so that the patterns will draw from the sand accurately—thereby giving uniformity in the castings. This must be rapid in its process of operation to reduce the cost to a minimum. It is common practice for our molders to produce as high as 6000 piston rings daily.

In making a mold, the upper part of the molding machine has a highly polished plate which presses the sand in the mold by compressed air. By stacking the molds, one on top of the other, this surface makes one flat side of the casting. It must be accurate to insure uniform thickness and width of ring. When sand is put into the flask, it is riddled through a very fine riddle so as to eliminate lumps or foreign particles in the mold. The sand is then rubbed to and fro, and from side to side, skillfully, to insure a proper distribution before striking off the surplus at the top of the stripper plate. It will be noticed that a stripper plate is used to add an increased amount of sand above the flask before stripping. This is predetermined through test to give about 1/32 of an inch of sand above the top of each mold after it is squeezed. Molds are then carried out and stacked sixteen high, after which a pouring basin is placed on the top mold.

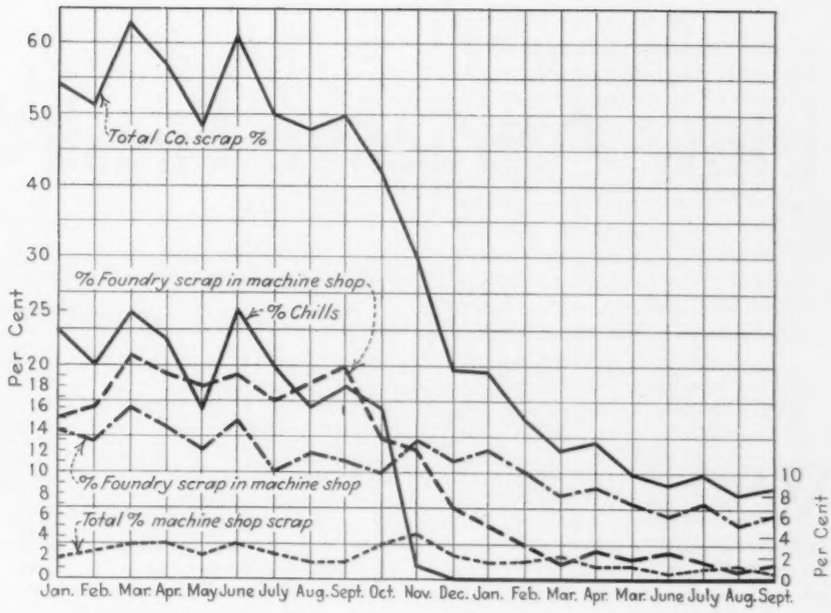
The castings after the shake-out are stripped off the gates and tumbled in a tumbling mill to eliminate surplus sands before foundry inspection and grinding.

Foundry Inspection

Expert foundry inspectors are employed to check over each casting for strained rings and dirty or rough castings.

The fruits of this scientific foundry control in processes and management can be realized best by referring to the "curve showing foundry and machine scrap." Here it will be noted that the total company scrap, due to irregular foundry practices, at first resulted in over 50 per cent loss. This in turn increased the price of piston rings materially and gave a certain

Fig. 14—Graphic proof of the value of control. Foundry scrap loss has been reduced from over 50 per cent to less than 10 per cent.


Total Co. scrap %
% Foundry scrap in machine shop
% Chills
% Foundry scrap in machine shop
Total % machine shop scrap
Per Cent
Per Cent
Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec. Jan. Feb. Mar. Apr. Mar. June July Aug. Sept.

degree of uncertainty to the quality of the product. It will also be noted on referring to the curves that during the reconstruction periods between October and December, rapid progress in reducing and improving the quality of our product was made. Today, through standard practices, the number of chilled rings entering our machine shop is practically zero and the total company losses from all sources average less than 10 per cent.

How Quenching Media Behave In Hardening Steels

STEEL, in order to acquire its most useful mechanical properties, must be fully hardened by cooling from a temperature of 800 deg. C. or higher at a rate in excess of a well-defined critical value characteristic of its particular composition. The necessary cooling rate is produced in practice by quenching in a liquid, but the rate varies greatly across a section, so that hardening is sometimes incomplete in large parts.

For certain types of service surface hardening alone is adequate and a plain carbon steel may then be used. The most active quench attainable appears best for this class of steel if its composition is properly controlled.

More commonly machine parts are required to have the same high mechanical strength throughout. In this case alloy steels are used to obtain complete hardening in larger sizes than is possible with carbon steels. The fastest practical quench would then permit use of minimum alloy content which is favorable to machinability. It introduces, however, extremely high temperature gradients with excessive distortion and danger of cracking in complicated shapes. The quenching medium actually selected must therefore afford a compromise between the economies of low alloy content and the penalties of distortion.

The best compromise appears to be attained in media which provide a high cooling rate within the steel over the temperature range 600 to 500 deg. C., together with a very low cooling rate below 400 deg. C. This variation of cooling rates reduces distortion considerably and minimizes development of residual stresses which are the cause of quenching cracks. Control of cooling rates below 400 deg. C. is more important the higher the carbon content. There are critical sizes with respect to cracking for each composition of steel and quenching bath. They are best avoided by slow cooling through the hardening transformation, usually below 400 deg. C.

With this background an analysis of the basic properties of liquids suitable for quenching was made by Howard Scott, Westinghouse Research Laboratories, East Pittsburgh, Pa., who discussed the subject before the American Society of Mechanical Engineers. At the outset he emphasized that it is essential to recognize at once that the cooling in a liquid of a metal surface from a red heat to room temperature usually progresses in three well-defined stages. During the first stage, vapor cooling, a continuous film of vapor incloses the metal. Vapor is a poor conductor of heat, so cooling is slow as long as the blanket remains intact. This is a manifestation of the familiar spheroidal state. Mr. Scott's discussion in substance follows:

The inclosing vapor film breaks down abruptly when the metal surface reaches a temperature which is characteristic of the liquid chiefly. Now cooling is by vapor-liquid convection; that is, the heat flowing from the wetted metal surface is transported by vapor to cooler regions of the bath, where it is dissipated by condensation of the vapor. Rate of heat transfer from metal to bath in this, the second stage of the quench, is much greater than in either other stage. Finally, as the surface temperature of the metal approaches close to the boiling point of the quenching bath, boiling ceases, so cooling in the third stage is by conduction and convection.

Studies of the surface cooling of metals in various liquids show that the first stage of cooling is most prominent in those of low and sharp boiling point. It is not conspicuous in good quenching oils, but is a dominant factor in water quenches. Since slow cooling cannot be tolerated during the early stages of a quench, it must be sedulously prevented from occurring in practice. Agitation of the liquid is effective in avoiding formation of the vapor blanket. When active agitation is not practicable, the solution of inorganic salts in water is helpful in preventing its incidence.

The second stage of surface cooling is the dominant one in the hardening of steel. Cooling powers of liquids, when cooling by vapor-liquid convection, differ considerably from one to the other. Water appears to be as effective as any liquid, with concentrated sulphuric acid a close rival. Rates of cooling are obtainable at some depth in the steel with a well-agitated water quench which closely approach the maximum theoretically attainable, a value determined by the thermal constants of the steel. Oils are less active in this stage than water. Low-viscosity oils are superior to high in this regard. Apparently viscosity is a major factor in determining the cooling power of a liquid.

Cooling in the third stage is relatively slow for all liquids. The change in cooling rate from the second to the third stage is particularly large in oils and is a valuable characteristic. It is enhanced by raising the temperature of the oil without sacrifice of cooling power at high temperatures.

How Attractive Finish Helps Metal

By R. W. MITCHELL, Ph.D., and HERBERT R. SIMONDS

WHEN chromium alloys and chromium plate were selected as trim for the Empire State Building, engineers were reluctant to estimate the life of the bright reflecting surfaces because the dust of New York contains oils and greases which adhere to and gradually darken any exposed area. Now, however, after two or three years, it appears possible that the scouring action of the wind, especially at the upper levels of the Empire State Building, may keep the metal surfaces bright for a great many years.

This is an exceptional case, for usually cleaning problems must be solved without external assistance. Much may be done, however, in the metal working industry to reduce the amount and expense of cleaning by considering the operation as a link in the production chain and by coordinating it with other manufacturing processes.

In a foundry the gates may be designed to facilitate their removal and the molding sand may be selected to give better surface to castings and thus reduce the job of cleaning. In a forge shop, by a change in the design of dies it may be possible to eliminate fins, and by forging at correct temperatures the surface density may be increased so that the subsequent cleaning operation is shortened. These and other similar features are important in analyzing the whole cleaning problem, but details in each case are of such a special nature as to be outside the scope of the present series.

Heat Treating and Cleaning

Heat treatment, on the other hand, is so nearly universal an operation that it affects most parts which are to be cleaned, and the resultant scales and oils of heat treatment constitute a major consideration for cleaning in the metal working industry. By using a liquid heating medium for the heat treatment it is possible in some cases to avoid oxidation and oil and thus to reduce or even entirely eliminate certain cleaning operations. The Bellis Heat Treating Co., Branford, Conn., for instance, has specialized in the development of liquid heating media for this very purpose. An installation of its equipment at the plant of a manufacturer of sterling silver heats bars and strips in 900-lb. charges by immersion in a liquid and in this way entirely avoids a cleaning operation preceding the next roll. When the material has been worked down to finished size, it is given a quick dip in a customary cleaning solution, but at least four previous cleaning operations have been eliminated.

At the plant of the Improved Seamless Wire Co., Providence, R. I., there is a similar heat treating installation handling light metal products which are later gold plated, and at this plant annealing is done without need of subsequent cleaning. In the case of steel products, wire and tubing are regularly being drawn and annealed in liquid baths without the customary descaling and cleaning operations.

Quenching and Tempering Oils

Heat treating in a liquid bath or other form of reducing atmosphere is often impractical and, generally speaking, material after heat treatment is covered with quenching and tempering oils. Glycerine occasionally is used for quenching and has the

The steam gun is one of the most effective cleaning tools in railway repair shops.

Products Sales

5—Cleaning as a Production Process

THE important subject of metal cleaning is too extensive and too complicated to be covered in any considerable detail in the present series on metal finishing. The interest here is to indicate the significance of cleaning in its relation to finishing. Some of the manufacturing economies which may be coordinated with the cleaning processes are described in this article which is the third devoted to the cleaning of metal.

The series is being prepared under the direction of Mr. Simonds for THE IRON AGE. Dr. Mitchell is technical director, Magnus Chemical Co., Garwood, N. J.

advantage of being more easily removed. Increased production and lower operating costs are usually obtained if the tempering or quenching oils left on the work are removed. If the subsequent operation is grinding, removal of the oil will make the parts easier to handle and will facilitate the wheel action. Where oxide or scale is to be removed by sand blasting, prior removal of the oil will allow the sand to cut the scale much easier. It will also prevent loading the sand up with oil, and resultant gumming of the machine.

Parts coming from oil baths should be so handled as to allow the oil to drain freely for a short time to recover the oil and to avoid loading the cleaning tank. While still warm, they should then be cleaned by soaking in a suitable solution. Parts should not be allowed to stand long before cleaning, as the oil then becomes thick and gummy and more difficult to remove.

Cleaning After Buffing

Inasmuch as most electroplated surfaces are prepared by polishing and buffing, cleaning before plating resolves itself generally into removing the buffing compound and other dirt picked up in these operations. There are, however, many cases where the removal of slushing or machining oil from steel is important. The work may be classified as:

1. Iron and steel
2. Brass, bronze, copper, nickel silver
3. Die casting and other soft metals.

The general practice is to use an electric cleaner for such work, as in a plating shop, of course, current is available. Over-pickling must be avoided before plating. Pitted steel or iron, even after thorough cleaning and good nickeling, has been found to be poorly resistant to rust. A trace of ferrous hydroxide left in the bottom of the pits or capillaries prevents good bonding.

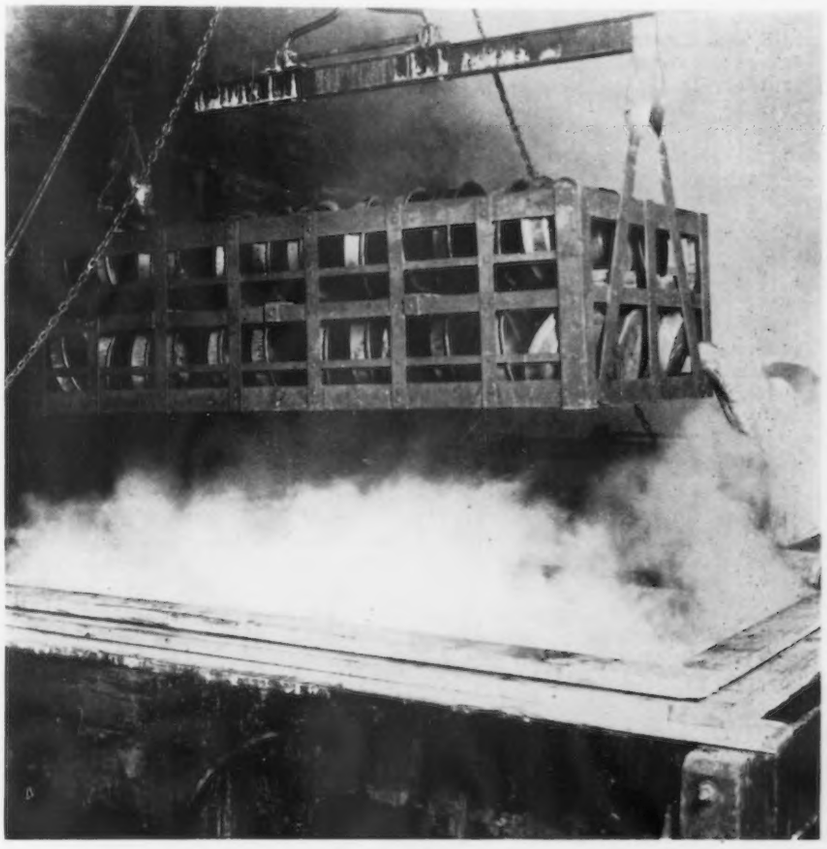
This emphasizes the necessity for proper cleaning before pickling to insure the minimum of time in the acid, and to insure even action.

Many buffing and coloring compounds contain stearic acid, and others contain wax and grease. The former is readily saponifiable even in a mildly alkaline solution. But the soap-formed sodium stearate—is a very slowly soluble compound. Washing solutions used after buffing often leave a thin film of this slowly soluble soap upon the work which takes long soaking or scrubbing to remove.

A proper cleaning compound will act to form a readily soluble compound instead of the above soap. It not only saves time, tank space, and steam, but gives better results with less chance of tarnish. These compounds containing grease are quickly emulsified. Fine solid particles of abrasive are not left behind upon the work but are floated off into the cleaning solution and green chromic oxide compositions, ordinarily very difficult to remove, are readily washed off.

Selecting Cleaning Method

Having done all that is possible in reorganizing general manufacturing practice at a plant so as to make cleaning as easy as possible, it then becomes necessary to select the means



Automobile stampings are cleaned in process by using large alloy steel baskets and large dip tanks.

These barrels use sawdust for cleaning metal punchings.

of cleaning best suited to the work in question. A steam gun may be advisable in some cases as, for instance, in locomotive repair shops, or perhaps a sawdust tumbling barrel may be best as in the case of metal stampings which are to be plated.

While there are many special types of cleaning in use, the bulk of the washing of metal as a production process in industry may be classified under three headings:

1. Still tank cleaning. Simple immersion of the dirty work in baskets or on racks in the cleaning solution, usually at boiling temperature, without or with agitation of the work. Soapy cleaners are best here.
2. Using mechanical washing machine. Here the impact and shearing action of high velocity jets gives mechanical aid to the cleaning action of the solution. Because of foaming difficulties, cleaners containing soap may not be used unless anti-foaming acids are added. Completely soluble cleaners should be used to avoid plugging nozzles and loading conveyors.

   Cleaning materials for use in mechanical washers must be quick acting as in most cases the work goes through on a conveyor and is in the wash zone for a short time only.
3. Electrocleaning. The general features of this method have been presented. The details in each case must be adjusted to conditions.

Aluminum when electrocleaned uses the cathode method. Die castings should not be cleaned in the same bath used for copper, brass, or other copper alloys. Copper and brass may be cleaned either anodically or cathodically; the latter is more commonly used. Iron and steel may be cleaned either anodically or cathodically. The best practice is to do both by means of a two-pole double-throw switch, reversing the polarity during cleaning. It is best with heavy work to start as cathode, and after about one minute, to reverse current, making the work the anode. Some reverse again, making the work the cathode for the second time just before removal.

If the principal part of the dirt to be removed is scale, that will call for pickling or descaling operations which will be described in considerable detail under the heading of descaling in a subsequent article. Oils and greases may be partially removed by centrifuging.

The Steam Gun

The steam gun as a cleaning tool has so many possibilities that some further description of its use may be advisable. Essentially it is a device for projecting at high velocity an atomized cleaning solution against the surface to be cleaned or stripped. In principle it is an injector with suitable control valves and hose connections. In variety of design it may use almost any steam pressure and may use one or more supply lines from cleaning solution reservoirs. The use of steam is not always necessary as some manufacturers are successfully using compressed air, but usually the temperature of the steam jet is a valuable aid. In practice the mist of hot cleaning solution striking the dirty surface at high velocity cuts through and emulsifies the oil and dirt and then by merely shutting off the supply of cleaning solutions, the surface is effectively rinsed.

Many different classes of work are effectively handled with the steam gun. One of the chief of these is found in railway locomotive repair shops where incoming parts, particularly the large, unwieldly parts, are cleaned with a steam gun at lower cost than any other method.

Stripping Paint

By proper choice of cleaning compound and adjustment of impinging pressure, oil or dirt may be cleaned from a painted surface without injuring the paint. In other cases the compound may be so changed as to cause complete stripping of paint. This will be more fully described under the heading of salvage cleaning.

The design of tips on a steam gun should suit the particular material being cleaned. For a flat surface a flat nozzle tip giving a sheet of spray is best. For irregular surfaces a round nozzle may be best. The actual size of the opening must be determined by the pressure of the steam used and the nature of the dirt being cleaned. Very often test operations with varying steam pressures will determine the most economical method. Some manufacturers use a relatively low steam pressure in two operations; that is, one operator uses a gun chiefly to apply a coating of cleaning solution, and he is followed by a second operator with a second gun which finishes the job.

Where steam is not available, small portable steam gun cleaning outfits may be used. These units containing oil-fired boilers and suitable tanks are each mounted on a small truck which may be easily moved throughout the plant.

Selection of Cleaning Compounds

The material used in the cleaning solution will vary widely with the requirements of the job. Different types of compounds will be used, depending upon whether the work is aluminum, die casting, or similar soft metal, brass or steel. It also depends upon the nature of the dirt to be removed, and upon the type of equipment; that is, whether still tank, electrocleaner or mechanical washer. Aluminum, zinc and the alloys which are readily susceptible to alkaline corrosion must of necessity be cleaned in a solution of low pH and one preferably containing an inhibitor to prevent chemical attack. Brass should be cleaned in a solution which will not tarnish as it cleans. Buffing compounds, smut, grime and solid-particle dirt are best removed in cleaners high in soap. Mineral oils are best removed in cleaners low in soap and high in alkali.

For electrolytic cleaning a material giving a solution of high conductivity, with no electrochemical effect upon the electrodes and with but slight sudsing action, is required. This makes it apparent that choice of cleaning material is not a simple matter. Proper recommendations based upon a thorough understanding of all factors involved and embodying

an up-to-date knowledge of best practice are valuable.

Preparation for Cleaning

In many cases parts such as screw machine products can be freed from considerable oil by draining, or better, by centrifuging before cleaning. This not only makes cleaning easier but allows recovery of the oil. Large parts which have been machined may have chips blown out of holes and pockets to advantage by use of a compressed air blast. Proper procedure and careful work in the polishing and buffing room can considerably cut down the amount of composition loaded on to the work. Prompt cleaning of such work makes the cleaning easier.

Preliminary to washing, partial removal of dirt is sometimes effected by sand blasting, tumbling, and mechanical stripping or scrubbing, as with revolving wire brushes or buffs. Sometimes a preliminary dip in a solvent or a cleaning solution aids in the efficiency and cleanliness of the final cleaning operation. Buffed work is sometimes first dipped in a solvent such as Toluene or Xylene to soften the dirt before going to the electric cleaner.

Mechanical Features

In cleaning operations mechanical features such as agitation, circulation, electrolytic action, and temperature regulation are often of major importance and any one of these may be the controlling factor in the cleaning process. Different sizes and shapes of work can be handled best by different methods. Examples are baskets, tote boxes, racks, hoods, or any one of the various types of conveyors used in mechanical wash machines.

The selection of the method of handling work through the cleaning cycle is most important, not only in minimizing labor charges but in getting the best results in the cleaning itself. Obviously, small threaded or slotted screw machine products will not be well cleaned if put through the cleaning process closely packed in tote boxes. Parts with knurled areas or irregular surfaces which catch and hold buffing compound cannot be cleaned as well in a still tank as by means of mechanical agitation to shake out the dirt which the cleaner has loosened.

Material Handling

Proper linking of the cleaning operations with the preceding and subsequent operations by mechanical handling requires that the cleaning operations function uniformly and in proper timing with the other production steps. All the usual types of conveyors are in practical use not only for bringing work to the cleaning operation but for carrying it through the various stages of cleaning. Work may be handled in and out of the soak tank, the electric cleaner, the hot and cold rinse, the acid or other dips, and the hot air dryers, by overhead monorail conveyors, chain conveyors, and other familiar types. The conveyance may be continuous or intermittent.

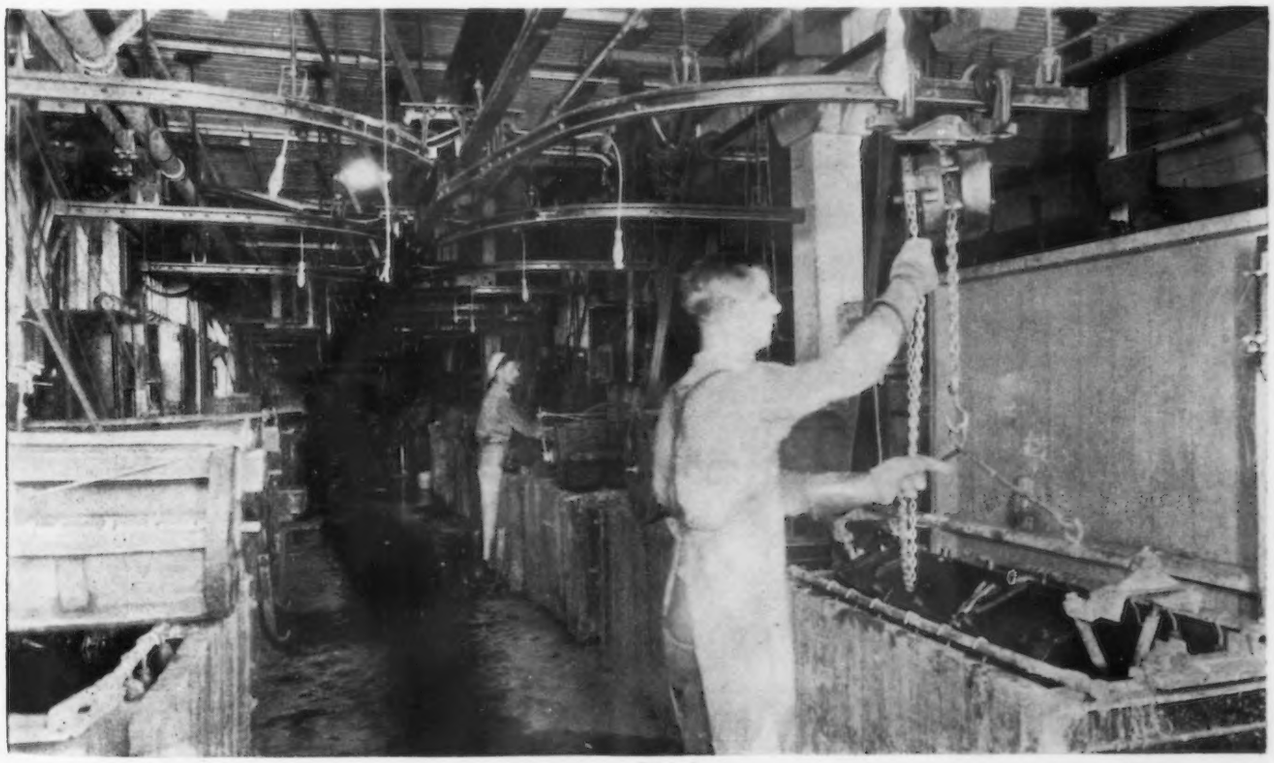
For agitation, a number of different means are available. The simplest form is that provided by vigorous boiling and rolling over of the cleaning solution itself. Circulation of the solution is aided by arranging baffle plates to create convection currents. Circulation by means of pumps is effective and is of course the principle used in most mechanical wash machines. The pump may discharge the solution over or against the work by means of multiple jets, or in those cases where it is necessary to avoid foaming or to keep the work submerged out of the atmosphere, the jets may be submerged in the cleaning tank.

Agitation Is Helpful

Propellers immersed in the tank are used but are not common. The work itself may be agitated by up and down or traverse motion in the tank by means of cams, eccentrics, rockers, or conveyors, which usually actuate rods, holding baskets, racks or trays which dip into the tank. Tumbling barrels or washing machines which contain a rotating helical conveyor furnish another sort of agitation.

The gas evolution at the electrodes of an electrocleaning tank provides another type of agitation, and sometimes agitation is effected by bubbling compressed air or live steam through the solution. Usually compressed air is not recommended, however, as it rapidly cools the solution, causes tarnishing, and creates too much vapor in the atmosphere.

Increase in temperature lowers the tension of cleaning solutions, or, in



At the plant of the Great Lakes Plating Co., Chicago, an elaborate monorail conveyor system serving each individual tank effectively reduces handling through the cleaning operation.

other words, increases their wetting and penetrating power. Slushing oils, lubricating oils, tempering oils, and polishing grease have their viscosity greatly decreased with rising temperature. Heat causes expansion of almost all metals and this tends to loosen dirt or foreign matter caked upon the surfaces, especially in crevices and corners.

Many large cleaning installations, where uniformity and reliability of results are important, have the temperature of their cleaning solutions controlled by thermo regulators. An unnoted lowering of ten or twenty degrees in the temperature of the cleaning bath may seriously decrease the cleaning efficiency. In the cleaning of aluminumware, maintenance of the temperature just below the boiling point, at say 180 to 200 deg. F., is desirable to prevent attack. In the same way, in the cleaning of brass, maintenance of the solution at say 200 to 210 deg. is an aid to avoid tarnish.

In the removal of some buffing compositions, washing seems to go faster in the range of 160 to 180 deg. In such cases the advantages of automatic temperature regulation are obvious. In general, however, it can be stated that increase in temperature almost always increases cleaning action. It is never safe to assume that you are getting a boiling temperature in the solution by any other evidence than the reading of a thermometer. An undersized heating unit for a cleaning tank is always a costly economy.

Cleaning for Inspection

Obviously, for satisfactory inspection all parts should be cleaned—otherwise gaging, visual inspection, etc., are hampered. No inspector or assembly man should have his work slowed up by parts anything other than *strictly clean*. Often "bare-metal clean" is not desirable as finger prints, etc., may cause subsequent rusting. For such cases a method of cleaning and anti-rusting in one operation should be used.

Finished parts for storage or transport should also be most carefully prepared for final handling and inspection by the purchaser. Today, all industries are becoming more and more particular about this. Tins no longer reach the consumer greasy with oil; they are washed clean. Steel tools and hardware today seldom will soil the skin of the customer who handles them. They may be anti-rusted by a thin non-greasy film, but are seldom flooded with slushing oil. Kitchen utensils, motors, machinery—all are put in the best possible condition to appeal to the eye of the purchaser. No greasy, grime-holding, hand-blackening, clothes-soiling surface ever improved the chances of a sale. Methods have been so well developed for mechanical cleaning that today even the cheapest ten cent store hardware and kitchen utensils can be cleaned and ball burnished to an excellent finish.

Steam Locomotives Streamlined

THE AMERICAN LOCOMOTIVE CO. has designed several steam locomotives that are capable of speeds of 120 miles and more, if that speed is wanted. The trend of modern design for streamlining and harmonious outside appearance has been incorporated in the new models by O. Kuhler, artist-engineer, who was called in by the locomotive company as consultant.

The lines applied to these engines could not be governed by beauty alone, but had to follow closely the existing form. For this reason the familiar cowcatcher has been retained but is entirely sheeted in and provided with anti-climber rails that are designed to sideswipe obstructions. These rails at the same time form the steps leading up to the running board and the hinges for the front cowling, thereby giving access to air pumps and boiler front. The headlight is located on top of the boiler and streamlined together by a capuchon with the invisible stack. Instead of the unsightly side shields in use on European locomotives, a smoke deflector typical of all Kuhler designs is applied to the stack.

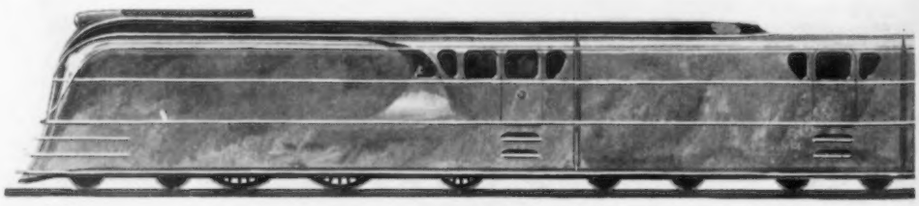
Sandbox, dome, bell, whistle, safety valves, etc., are all invisibly streamlined into the cowl on top of the boiler. Kuhler has specified bright red enameled sidepanels for the top cowl, or an encased Neon-electric sign bearing the name of the train. On top of the cowl is a fin, designed so as to insure an even flow of the exhaust steam from the stack.

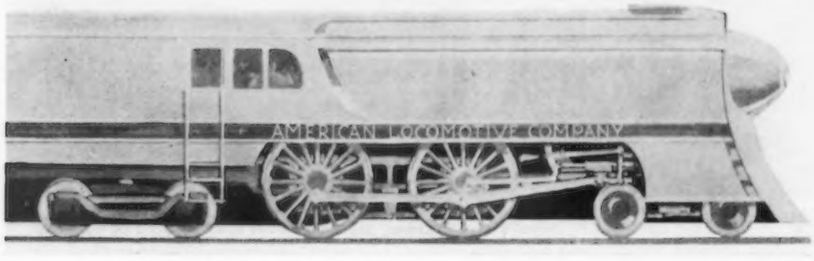
The engineer's cab is streamlined to the full width of the train. All wheels and gear are covered with sheeting, leaving convenient openings for servicing. The tender is closely connected with the engine and carries in its rear part a compartment for air-conditioning and lighting apparatus of the train.

Kuhler also has designed a few semi-streamlined models which allow servicing of runnng gear in the customary manner. Wheels and side rods are uncovered in these designs and the engines are only streamlined in front, boiler and cab.

▲▲▲

At right, Fully streamlined steam locomotive. Below, Semi-streamlined steam locomotive.





▼▼▼

Automatic High-Production Press Produces Forgings in One Impression

AN automatic forging press, capable of producing forgings in one impression and embodying a design new to this type of work, is being introduced by the General Machinery Corpn., Hamilton, Ohio. With 900-ton pressure capacity and a speed of 70 strokes per min., the press is intended for large volume production in connection with a furnace, such as illustrated, for heating bars of 10 to 12-ft. lengths. When heated to about 2250 deg. F., the bars are pushed through the furnace, one at a time, into the feeding grippers of the press, emerging as a string of forgings.

Although only one forging is produced at each stroke, the die employed has two forging impressions. The die is shifted so that the impressions are used alternately, permitting a coolant to be applied to the impression not in use. Since the press makes 70 strokes per min., the die impression is in contact with the hot metal only about 1/5 sec. every other stroke. This results in a material extension of the life of the dies. Die life depends somewhat on the shape of the forging, but will average from 20,000 to 25,000 pieces per die per sinking.

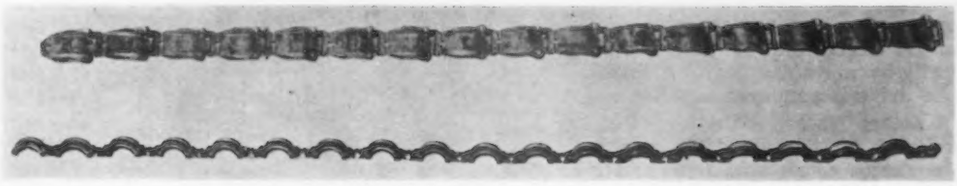
To avoid the destructive effect of the tendency of the die slide to rebound as it passes the bottom of its stroke under a load of 900 tons, and at a speed of 70 strokes per min., the main drive gears, clutch and drive shafts have been eliminated from the design of the press. This, it is stated, insures smooth operation. To stop the press the operator shuts off the driving motor; the motion of the flywheels is stopped by application of an air brake.

The crankshaft is proportioned so that it will not deflect sufficiently to break down the oil film on its bearings when being subjected to a full load. The frame tie rods are stressed without being heated. After the tie-rod nuts are tightened, hydraulic jacks are placed between the bed and slide and the press is subjected to its rated load. This process stretches the tie rods, producing a space between the uprights and the bed of the press, which is filled with shims of equal thickness and which conforms to the shape of the bottom ends of the uprights.

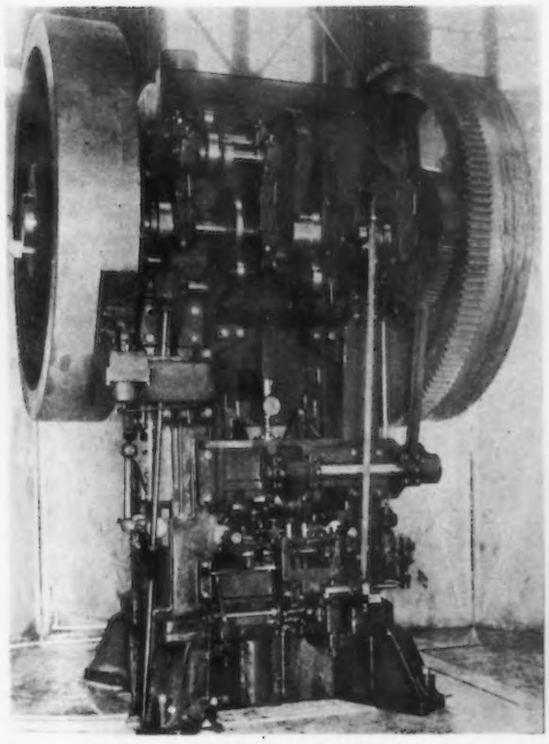
To remove the shims the press must be subjected to a load of 900 tons. There is no gapping of the frame members, therefore, under any load up to 900 tons, but the rods will adjust themselves to loads in excess of that amount, eliminating excessive overloads on the crankshaft and consequent scoring of the bearings and breakage of the shaft. This is the most important reason for the frame being of the built-up type rather than of massive, one-piece steel construction.

To prevent the stalling of the crankshaft on bottom center, which might occur under heavy pressure, a bracket on the upright and one bolted on the flywheel have been provided. A light-weight, specially-designed, high-pressure jack fits into these brackets. It is possible, therefore, easily and quickly to jack the shaft past center, the pressure required to do so being contained within the press itself.

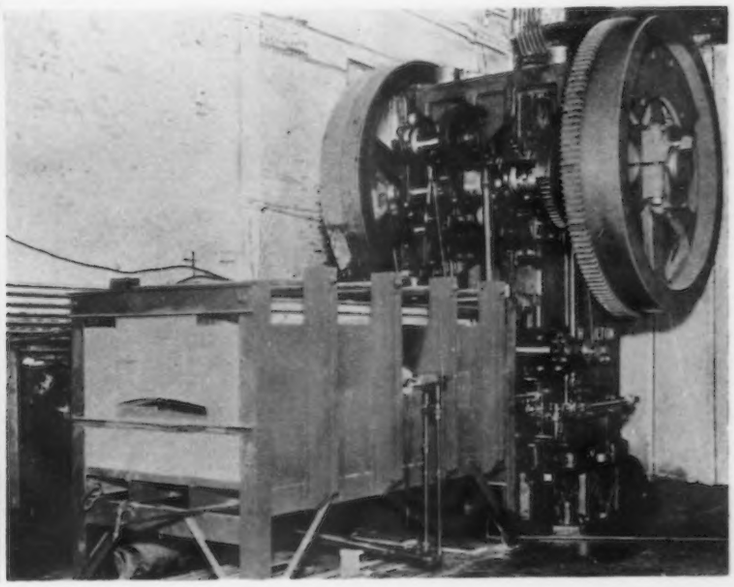
While many different forgings can be made in the press, it has been set up for demonstrating purposes to make automobile connecting rod caps



Connecting rod caps are forged from 9/16 x 1¾-in. bars, 10 to 12-ft. long. Loss due to flash is about 12 per cent.



This forging press, operating in connection with a furnace as shown below, is designed for large volume production. Bars are pushed through the furnace into the grippers of the press, emerging as a string of forgings. The die employed has two forging impressions, and is shifted so that the impressions are used alternately, permitting coolant to be applied to the impression not in use.



and automobile door hinges, as shown in the illustration. To produce the hinge 9/16-in. x 1¾-in. bars are used. The loss due to flash is 12 per cent, Incorporated in the design is a reducer mechanism which reduces the bar at the thin leaf portion of the hinge, eliminating the greater part of the sidewise spread into flash which otherwise would result. Forging bars are 64 in. long; by the reducing operation they are extended to 85 in. This operation likewise serves to break away the scale, presenting to the forging die a clean piece of steel. The press weighs 140,000 lb.

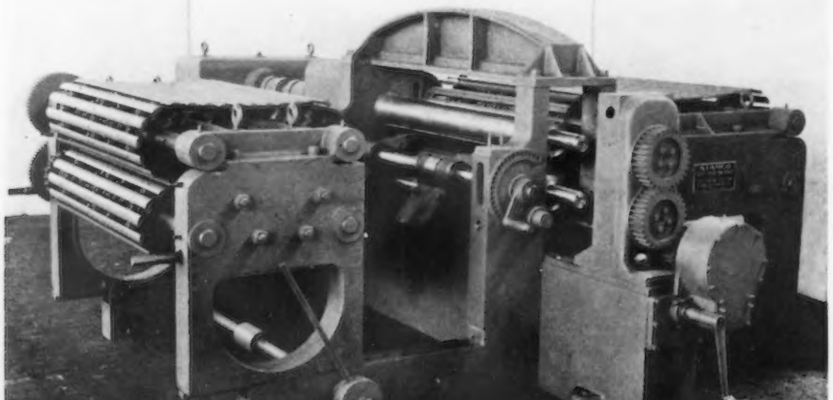
New Slitting Shear of Conveyor Type

THE continuous holddown conveyor-type slitting shear illustrated, a recent development of the Streine Tool & Mfg. Co., New Bremen, Ohio, will handle sheets 38, 50, 62 or 74 in. maximum width and is designed for four sizes of cutters, 8, 12, 15 and 20 in. in diameter.

On the endless roller chains of the conveyor are mounted half oval slats made either of bakelite or steel, depending on the type of material processed. A yielding track under spring pressure urges the slats of the upper unit toward the lower unit, thereby holding the sheet firmly as it is being fed through the slitting cutters. The rear conveyor can be racked back and the left housing can be moved outwardly to facilitate changing cutters. Provision is made so that the axes of the cutter shafts are always parallel. Cutter arbors rotate in anti-friction bearings mounted in eccentric sleeves and are adjusted vertically by worm and gear. A spindle-type drive is employed.

Another feature is the scrap cutter designed for use with this machine. The device consists of four rotating blades which sever the strip as it passes over an anvil roller. So that the cutter will be effective regardless of the thickness of stock being worked, eccentric tool steel bushings are inserted between the shaft and its component anvil roller. By means of a crank handle at the side of the machine the anvil roller may be positioned closer to the cutting edges of the blades. Adjustment of 0.001 in. is said to be possible, and can be made while the machine is in operation.

For feeding sheets into the slitter a ball-bearing roller feed table, with a quickly adjustable side gage, is available.



Continuous holddown conveyor-type sheet slitting shear. A scrap cutter and a roller feed table have been designed for this machine.

Super-Sensitive Square-Type Level

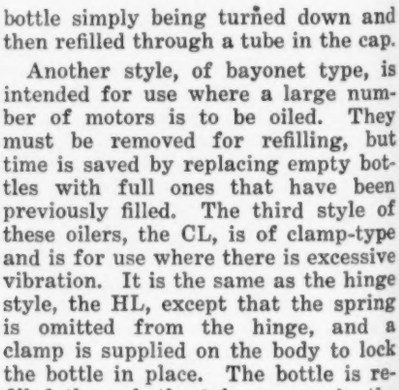
A SQUARE-TYPE level of high accuracy, such as required for assembling machine tools and other industrial machinery, is being marketed by the George Scherr Co., 128 Lafayette Street, New York. In addition to sensitivity, a feature is the rigid square frame. The level can be used for alining both horizontal and vertical surfaces, as well as shafting. Both the longitudinal and cross levels are permanently located, cast in sulphur, in the frame, and are safeguarded against accidental damage. Accuracy of 0.0005 in. per ft. is guaranteed for the longitudinal level; in circular measurements, this accuracy is equal to 10 sec. of arc.

The vial of the longitudinal level is ground on the inside and filled with chemically pure sulphur ether, as well as thin air, and then hermetically sealed by fusing of the glass. The vial is graduated in intervals of 2 mm. on both sides of the center of the bubble surface. The sides of the frame are carefully scraped. By means of a secondary cross level, the level is held in horizontal position when used on shafts, V-ways, and the like.

Constant-Level Oilers for Motor and Other Bearings

GITS BROTHERS MFG. CO., 1846 South Kilbourn Avenue, Chicago, is marketing three styles of a new constant-level oiler having a heavy glass reservoir or bottle that may be refilled or replaced easily. They provide a visible supply and automatically maintain a constant level of oil in the bearing.

One style of these oilers, the HL, has a special cover that is hinged to the body and holds the glass bottle, the bottle being held securely in the cover by a compression nut and cork packing. The oiler can be refilled without removing the glass bottle, the bottle simply being turned down and then refilled through a tube in the cap.



Hine-type constant-level oiler.

Another style, of bayonet type, is intended for use where a large number of motors is to be oiled. They must be removed for refilling, but time is saved by replacing empty bottles with full ones that have been previously filled. The third style of these oilers, the CL, is of clamp-type and is for use where there is excessive vibration. It is the same as the hinge style, the HL, except that the spring is omitted from the hinge, and a clamp is supplied on the body to lock the bottle in place. The bottle is refilled through the tube cap as in the HL style of oiler.

THE NEWS OF THIS WEEK

Weirton Steel Co. Head Breaks with United States Labor Board

PITTSBURGH, Dec. 11.—E. T. Weir, chairman of the Weirton Steel Company, Weirton, W. Va., today dispatched a letter to United States Senator Robert F. Wagner, chairman of the National Labor Board, in reply to a letter dated Dec. 8 from that body, which proposed rules to govern the election to be held next Friday at the company's works at Weirton, W. Va., Clarksburg, W. Va., and Stubenville, Ohio.

In his reply, Mr. Weir stated that the board had made proposals to govern the election which the company had no right to accept, and that the rules and regulations suggested did not conform to an agreement entered into between the company and the Labor Board on Oct. 16, 1933. He charged the board with attempting to impose an entirely new form of organization on the employees under the pretense of supervising the election.

Declaring one of the board's suggestions "vicious and unfair," Mr. Weir said: "The change which you are proposing is not a matter of procedure or supervision of the election, but is an attempt to impose an entirely new form of organization on our employees. We think that neither the company nor the Labor Board has any right to change the plan adopted by the men. Under the circumstances we must consider any arrangement with you terminated and the election will proceed in accordance with the rules adopted by the employees' organization."

Mr. Weir's complete letter follows:

Dec. 11, 1933

Hon. Robert F. Wagner,
Chairman, The National Labor Board,
Washington, D. C.

Dear Senator:

Your letter of Dec. 8 addressed to the Weirton Steel Co., transmitting copies of proposed rules and regulations for the conduct of elections to be held this week, was received on Saturday and has been handed to me for reply. In your letter you refer to agreement with our company dated Oct. 23; I presume you mean the agreement of Oct. 16.

These rules are not in accordance with the agreement which we made with you on Oct. 16. If you will examine the testimony you will note that at the insistance of the company your board agreed that the election to be supervised by your board was the next regular election provided for by the by-laws of the employees' organization of the Weirton Steel Co., to be held the second week of December, with nominations on Monday and the election on Friday. We attach an extract from the notes of testimony bearing on this point. We agreed to recommend amendment of the by-laws to open the eligible representative to non-employees to conform to the provisions of the NRA, and various members of your board, as appears by the record, asked that the by-laws be so amended.

We recommended such an amendment to the rules committee of the employees' organization, and it was adopted. No other suggestion was made by any member of the Labor Board as to any other amendment necessary or proper to bring the by-laws into conformity with the Act.

Pursuant to these by-laws, the employees' rules commitee drafted rules for the election, and posted them about Wednesday of last week, having given a copy to your representative, Mr. Dewey, about a week before that.

The rules which we have just received and which you request us to post are not in conformity with the by-laws of our employees' organization, which was discussed before your board. Your rules propose to increase the number of representatives from 49 to 98. The employees' representation plan now in force was adopted by the employees themselves, and we believe they have the right under the law to determine their form of organization and the number of representatives they desire. The change which you are proposing is not a matter of procedure or supervision of the election but is an attempt to impose an entirely new form of organization on our employees. We think that neither the company nor the Labor Board has any right to change the plan adopted by the men, and this was one of the matters to which you agreed when it was specifically called to your attention at the conclusion of the hearing in Washington before the agreement was signed. It is a radical change in substance in the form of plan now in force at Weirton and not of mere procedure, and we have no right to consent to it.

Your rules also provide a method of nominating by petition, which is not in accordance with the by-laws of our employees' organization and is not only a vital change in the substance of their plan but is inherently vicious and unfair.

Our employees' organization's by-laws require nomination by secret ballot and this is the only fair method. If nominations are by petition the persons who sign the petition are subjected to criticism, threats and intimidation, either in obtaining signatures to their petitions or by those who oppose the candidate. It is unfair to require employees to sign a petition to place a name in nomination. Furthermore, the dual system of nominations which you propose would permit the same employees who had participated in the nominations by ballot to sign petitions later to have other names placed upon the ballot. It is obvious it would be very unfair to enable a name to be placed on the ballot on a petition signed by only ten people when other employees who had actively competed for a place on the ballot and lost had received a larger number of votes. Notwithstanding defeat at the primaries, defeated candidates could have their names placed on the ballot by obtaining only ten signatures. This would nullify the primary election and completely destroy every element of free choice by secret ballot in nominations, which is one of the fundamentals of the plan adopted by our employees. It is not a matter of procedure but a basic change in their plan.

The rules which you sent us also propose to permit voting by persons who are no longer in the employ of the company. This is a substantial departure from our employees' organization plan and unsound in principle.

Your rules further permit a designation to be added after the name of a candidate. We assume you intended to permit candidates to designate labor organizations as you did in the coal company elections. There is no such provision in the act, and it is not in accordance with the by-laws of our employees organization.

Our agreement with you permits the Labor Board to supervise both the nominations and elections, and although nominations are being held today in accordance with the by-laws they are receiving no supervision from your board. We con-

sider, therefore, that you have not only failed to carry out your agreement with us but are attempting to extend your right to supervise the procedure of the election to make basic changes in our employees' representation plan which are not in accordance with our understanding with you nor with the provisions of the National Recovery Act. Our employees strenuously object to this and, consequently, we are not going to post the notices which you sent.

From the time of our agreement on Oct. 16 until late Saturday afternoon, Dec. 9, we had no notice from you as to your proposed supervision of this election. Several days before we received your communication our employees had posted rules in accordance with their by-laws, and the election was ready to proceed beginning at 1 a.m., Monday, Dec. 11. Your delay gave us no opportunity to discuss these matters with you and the election is, therefore, in progress under rules drafted by our employees in accordance with their by-laws. Under the circumstances, we must consider any arrangement with you terminated, and the election will proceed in accordance with the rules adopted by the employees organization.

Very truly yours,

(signed) E. T. WEIR.

Chairman.

Primary Favors Company Plan

Results of the vote on Dec. 11 for nominees at the Weirton and Clarksburg, W. Va., and Steubenville, Ohio, plants of the Weirton Steel Co., conducted by the employees under supervision of their own rules committee and in accordance with by-laws of the employee representatives' organization indicated a conclusive victory for the workers and a complete rout of the advocates of the Amalgamated Association of Iron, Steel and Tin Workers of America. The Amalgamated group, which had claimed a majority membership among employees at the Weirton company's plants, exhorted the men not to vote. The votes cast by an overwhelming majority at the primary election yesterday, however, are interpreted as a definite expression of preference by the men in favor of their own employees' representative plan.

Only those candidates named in the primary election will appear on the ballot to appoint new representatives at the election to be held on Dec. 15. At the primary election 98 candidates were chosen. Of that number 49 are to be chosen at the final election this week. The final count of the primary vote showed that 8436 eligible employees out of a total of 11,463 employees, or 74 per cent of the men on the company's payroll, had exercised their right to select by secret ballot. The outcome of the primary vote is hailed as a decisive rejection of the petition system of selection advocated by the Amalgamated Association.

Demonstrates Grinding Machines of New and Improved Design

MORE than 20 grinding machines of new or improved design that facilitates operation and gives increased output were demonstrated by the Norton Co. at its Worcester, Mass., plant, Dec. 4-8. The first three days were given over to a general conference and to group meetings of Norton and dealer salesmen and the last two days to demonstrations for guests from the automotive, steel and other industries.

A large section of the exhibit was devoted to the new type C cylindrical grinder described briefly in THE IRON AGE of Nov. 23. Another contained the new Cam-O-Matic cam grinder, a hydraulic double-head crankshaft pin grinder and other machines developed for the automotive industry. A third section featured lapping machines, including vertical units for cylindrical and flat work, and an interesting display of a wide variety of lapped parts. A new motorized tool and cutter grinder, two of the new 6 x 18 in. hydraulic surface grinders, a 10 x 24 in. surface grinder with automatic cross-feed, and type D cylindrical grinders were also demonstrated. Finally, in adjacent shop departments, were shown roll grinders, one with a new "Hydro-Former" device, a conjugate cam grinder that grinds all cam contours simultaneously on an automotive camshaft, a carwheel grinder and other machines.

The new type C cylindrical grinders included units with hydraulic and mechanical traverse and other arrangements. Some were equipped with the new "Nortonized" automatic electric sizing device by means of which the wheel feed is controlled electrically directly from the work during the grinding operation. Production operations to limits of 0.0003 in. are obtainable and wheel truing or replacements in no way disturbs the set-up for size.

In the center of this group was a disassembled type C machine, showing the separate parts and unit assemblies, including the hydraulic table mechanism. A feature of this new line is its flexibility. A wide variety of arrangements is available, and practically any model can be converted into any other of the same swing, which among other advantages is intended to simplify the user's obsolescence problem. Heavy construction of the wheel unit with its slide mounted motor weighing, for example, more than a ton, was impressive. The spindle of the new 10-in. machine weighs 77 lb., as compared with the 51 lb. spindle of an older model 101 in. Norton machine.

A feature of the roll grinder exhibit was the introduction of a hydraulically operated-attachment for producing uniform crowns or concave faces on rolls. This device, designated as the Hydro-Former, is applicable to any Norton double-table machine. It is stated that because of the de-amplification of this unit together with the fact that it operates through an arc considerably greater than the arc through which the end of the roll swings, relatively coarse adjustments of the form bar produce very fine results in the roll face. The device includes a table-type diamond tool holder which can be mounted without removing the roll. It is made so that when in position the diamond is directly in line with the pivot point of the table. Consequently, a concave or convex wheel face is produced which corresponds to the crown or concavity of the roll face. This, it is stated, assures contact of the entire wheel face instead of a single point, as would be the case were a straight face produced.

The conjugate cam grinder, developed for the automotive industry, is a large, powerful machine for grinding simultaneously all the cam contours on an automotive camshaft. Its three major parts are a wheel truing mechanism, grinding wheel unit with a wheel for each cam on the camshaft, and a work supporting and driving unit. The truing mechanism comprises a set of master cams, one for each cam on the shaft, and a corresponding set of diamonds actuated by the masters. The grinding wheels when new are 42 in. in diameter; they are worn to a discard diameter of about 29 in., and as they wear their speed is increased automatically.

Erie Loan To Finance Purchase of 4000 Cars

WASHINGTON, Dec. 12.—The Erie Railroad proposes to buy 3775 freight cars, 125 passenger coaches and eight mail cars. This was made known in an application the carrier filed yesterday with the Interstate Commerce Commission for approval of a loan of $11,954,000 which the Public Works Administration has announced it has allotted to the Erie. The freight cars to be bought consist of 2500 50-ton self-cleaning hopper cars; 500 40-ton plain box cars; 500 40-ft., 40-ton automobile cars; 100 50-ft. furniture cars; 50 covered hopper cars and 125 50-ft., 70-ton flat cars. The passenger train equipment to be purchased consists of 50 through passenger coaches; 75 suburban passenger coaches and eight mail cars. The Erie has already requested competitive bids on the equipment it proposes to buy.

▲▲▲ PERSONALS ▲▲▲

T. H. DOANE has been elected president of the Foote-Burt Co., Cleveland, manufacturer of multiple spindle drilling machines, to fill the vacancy caused by the death of George E. Randles. Mr. Doane has been with the company 27 years, his first position having been as a shop apprentice. He was sales representative in Detroit for several years and has been vice-president since 1919 and in charge of sales and manufacturing for the past nine years. R. E. DELAMATER has succeeded Mr. Doane as vice-president. W. F. BABCOCK has been made second vice-president, a newly created position. Both Mr. Delamater and Mr. Babcock have served the company in various capacities for many years. THOMAS F. JONES, attorney, has been elected to fill Mr. Randles' place on the board of directors.

❖ ❖ ❖

FRANK BENDER has been appointed vice-president and general manager of the Lycoming Mfg. Co., Williamsport, Pa., a division of the Cord Corpn. JOHN E. DUNBAR, former purchasing agent, has been named assistant general manager.

❖ ❖ ❖

ARTHUR LANDIS, a vice-president of the Auburn Automobile Co., Auburn, Ind., has been put in charge of operations at the Connersville and Auburn plants. He has been with the Auburn organization for many years.

❖ ❖ ❖

D. E. WILSON, vice-president and treasurer of the Woodward Iron Co., Woodward, Ala., has resigned, effective Dec. 31. Mr. Wilson has been with the company for over 22 years.

❖ ❖ ❖

R. A. SCHOENFELD has been appointed representative in the Chicago district, with offices at 81 West Van Buren Street, Chicago, by the Cooley Electric Furnace Co., Long Island City, N. Y.

❖ ❖ ❖

ROBERT GREGG, president of the Tennessee Coal, Iron & Railroad Co., will deliver the principal address at the annual meeting of the Birmingham Chamber of Commerce on Dec. 18.

❖ ❖ ❖

J. B. DOAN, president of the American Tool Works, Cincinnati, was elected a director of the American Rolling Mill Co., Middletown, Ohio, the past week. Mr. Doan fills the vacancy caused by the death of James P. Orr, of Cincinnati.

❖ ❖ ❖

W. D. MOORE, president, American Cast Iron Pipe Co., has been reelected first vice-president of the Birmingham Chamber of Commerce.

C. F. KOLKMEYER and R. W. KOLKMEYER have become associated with the Chicago district sales office of Luria Brothers & Co., Inc., old materials dealer, of which W. E. RICHEY is manager. They formerly were connected with the Domhoff & Joyce Co., Cincinnati.

❖ ❖ ❖

J. M. LUTZ has been appointed western representative for the United Engineering & Foundry Co., with offices in the South La Salle Building, Chicago. He formerly was associated with American Steel & Wire Co., Tennessee Coal, Iron & Railroad Co., and for the past 10 years with Pennsylvania Lubricating Co.

❖ ❖ ❖

DR. E. C. GILBERT, former general manager of the Chapman Valve Co., has been made general manager of the Perkins Machine & Gear Co., West Springfield, Mass., to succeed FREDERICK H. RICE, who remains with the company as assistant treasurer.

❖ ❖ ❖

H. K. RUTHERFORD, for a number of years export manager and more recently sales manager of the industrial division of Henry Disston & Sons, Inc., Philadelphia, has been appointed manager of a newly established branch of the Sales Analysis Institute, Buffalo, which will be opened shortly in Philadelphia.

▲▲ OBITUARY ▲▲

THOMAS J. BRAY, director and member of the executive committee of the Youngstown Sheet & Tube Co., Youngstown, died suddenly in his office in that city on Dec. 11. Mr. Bray had been continuously identified with the steel industry since his graduation from Lehigh University in 1894 and was president of the Republic Iron & Steel Co. from 1911 to 1928. He was born in Pittsburgh on May 1, 1867. His first work was as apprentice in pattern making with the Lewis Foundry & Machine Co. After a short period with the Riverside Iron Works he returned to the Lewis Foundry company, of which he became chief draftsman. He resigned in 1890 to enter Lehigh University. After his graduation from the latter institution as a mechanical engineer, he became identified with the Ohio Steel Co., Youngstown, and later with McGill & Co., Pittsburgh. In 1901 Mr. Bray was made chief engineer of the United Engineering & Foundry Co., from which he resigned in 1906 to associate himself with the Republic Iron & Steel Co. as assistant to the president. Soon after he was made vice-president in charge of the operating department. He was elected president in April, 1911, and continued in that capacity until 1928. Mr. Bray was a director in a number of companies, and was president of the Beaver, Mahoning and Shenango River Improvement Association.

THOMAS J. BRAY

❖ ❖ ❖

CHARLES C. KRITZER, president and founder of the Peerless Ice Machine Co., Chicago, died Dec. 5, aged 72 years. Mr. Kritzer, one of the pioneers in the manufacture of ice machines, was born in Newaygo, Mich., and went to Chicago 27 years ago, at which time he founded the ice machine company.

❖ ❖ ❖

OTTO RICKER, general superintendent of the Badger Malleable & Mfg. Co., South Milwaukee, Wis., since its establishment in 1908, and brother to Adolph J. Ricker, president and general manager, died Dec. 6 after an extended illness with heart trouble. He was born in Watertown, Wis., in 1871.

❖ ❖ ❖

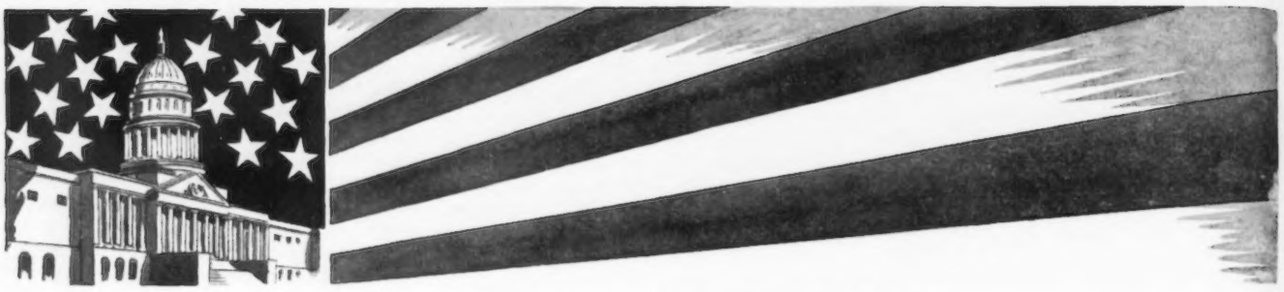
ADOLPH C. MILLER, secretary-treasurer of the Oshkosh Motor Truck, Inc., manufacturer of motor trucks, since its organization, died Dec. 6, aged 57 years.

❖ ❖ ❖

WILLIAM J. CLARKE, vice-president, American Forging & Socket Co., Pontiac, Mich., and Detroit sales representative of the Mahoning Valley Steel Co. and the Brainard Steel Co., died of a heart attack in his office in the General Motors Building, Detroit, on Dec. 7. Born in England, he had lived in the United States since he was two years of age. He was 52 years old.

❖ ❖ ❖

CHARLES R. BRYSON, formerly president of the Electro Steel Co., Pittsburgh, until his retirement four years ago, died at his home in that city on Nov. 26, aged 68 years.



THIS WEEK IN WASHINGTON

Labor Denied Code Authority Representation

Plan for Consumer and Governmental Observers Is Offered—Stricter Code Enforcement Seen in Setting Up of National Emergency Council

By L. W. MOFFETT
Washington Editor, THE IRON AGE

WASHINGTON, Dec. 12.—Organized labor's demand for representation on code authorities has been definitely turned down by General Hugh S. Johnson, National Recovery Administrator. This action is regarded as a victory for industry and for such organizations as the Chamber of Commerce of the United States, which has consistently opposed giving labor a voice on code authorities. They find less comfort, however, in a plan under consideration by which governmental boards with both labor and consumer representation would observe operation of codes. Just what this would involve has not been made clear, but it is believed that disputes over hours and wages would be concerned. This is based on a view previously expressed by General Johnson in which he stated that he thought there would have to be provided in connection with every code, "one way or another," a board on which labor has representation to sit on disputed questions of hours and wages.

General Johnson, however, has never agreed with a section of organized labor as to representation of labor on code authorities. No code authority has such representation, and it is understood that some organized labor leaders themselves have no desire for such representation. It is, therefore, probable that organized labor will accept the plan without resentment. In conferences over the subject with General Johnson, the proposal for such representation was urged by William Green, president of the American Federation of Labor, but according to reports, Mr. Green was not insistent on the point. Instead the idea of labor representation on boards to handle disputes over wages and hours is said to be altogether acceptable.

Organized labor is understood to be pleased with the operation of such boards under the bituminous coal and cotton textile codes. The plan under consideration is broader than the coal and cotton textile system. Proponents for purely self-regulation of business do not find this to their entire liking, although the plan ostensibly has no strong teeth in it because the Government representatives would simply be "observers," without the veto power they have on code authorities. Nevertheless, it is realized that when acting as Government "observers" they can exert a great deal of pressure of a major character.

The proposed boards evidently would reduce considerably the work of the National Labor Board and its 17 regional boards. The latter would be relieved of handling many disputes which would be negotiated by the new boards just as disputes are handled by labor boards of the bituminous coal and cotton textile boards.

Labor Demands Not New

Much has been written lately about organized labor's demand for representation on code authorities. The impression has been given that it is something new. On the contrary, such a demand has been made by organized labor since the NRA came into being. This is made clear by reference to the hearing on the steel code on July 31. On that occasion, Mr. Green, in addition to asking for the 6-hr. day and 30-hr. week, proposed that the steel industry be policed by an Advisory Council on Industrial Relations. It was suggested that the council be made up of seven members, three each from the American Iron and Steel Institute and the American Federation of Labor, with an impartial chairman to be appointed by the President. Demand for prominent organized labor representation also was made in connection with the automobile and other codes. The demand was not heeded and it is doubted that organized labor thought it would be given much attention at the time. Also as to representation on code authorities, organized labor—or at least an important element of it—perhaps shares the view of General Johnson that when labor assumes responsibility for management it is changing its own traditional policy. General Johnson has made the further point that, if such representation were accorded, labor would have to take responsibility for profit and loss, questions which, he has said, labor never has wanted to deal with.

Demands Less Insistent

While the standard organized labor demand for the 6-hr. day and 30-hr. week was emphasized repeatedly at initial code hearings, it is now heard less frequently. This probably indicates that labor shares the view of General Johnson that in its present condition industry would be bankrupted by such a schedule. Nevertheless, General Johnson has prophesied a shorter work-week in the early future. He says it is necessary to absorb unemployment, a view constantly expounded by organized labor. But the 30-hr. week remains in the background. It is a mark to shoot at and labor probably feels that it is only a matter of time until its goal is reached. The conception is not shared alone by organized labor, but by a few industrialists generally without any fixed ideas as to when or how it

can be accomplished. The forthcoming session of Congress likely will see the 30-hr. week proposed, but its adoption at such an early date seems highly improbable in view of the condition of industry.

Stricter Code Enforcement Probable

Stricter supervision and enforcement of NRA and AAA codes is seen as one of the outstanding purposes of the creation last week of the National Emergency Council. The council, to be headed temporarily by Frank Walker, who has been chairman of the executive council dealing with recovery problems, includes in its membership the Secretaries of Interior, Agriculture and Labor, the AAA and NRA administrators and the governors of the Farm Credit Administration and the Home Loan Corporation.

While it was stated that one purpose of the council is to supply information to the various Government agencies, it was also announced by W. H. Davis, national compliance director of the NRA, that the plan of the President provides for 48 compliance directors, one for each State, to replace the 26 temporary compliance directors. Mr. Davis explained that these State directors will have a sufficient staff of assistants and adjusters to develop the facts and adjust complaints at the place where the complaint arises, as far as practicable. In addition, there will be in each State an adjustment board working with the director. This board will consist of a representative of the public interest, a representative of industry and a representative of labor.

Machinery Far Reaching

Spreading still further its machinery, it was stated that it may be necessary for State directors to place representatives in the field in communities where a great volume of unadjusted complaints arise. Going still further, it was announced that where it is acceptable to labor and industry, it may be found useful to have local adjustment committees or boards to serve as "informational, educational and adjustment agencies." It has been reported that the organization will be so thoroughly complete as to have one or more representatives in each of the 3000 counties of the country. At the same time NRA has said that where there are approved agencies of "industrial self-government" they will handle complaints. This position is modified somewhat by a statement by General Johnson in a recent announcement as to code administration. The general said that "even where an industry is completely organized to adjust all complaints, it may still be advantageous for it to call upon Governmental agencies to supplement its functioning. Enforcement of complaints rests with the Department of Justice and the Federal Trade Commission.

If the State adjustment board is unable to effect an adjustment, the complaint will be forwarded to NRA in Washington by the State director. The NRA will forward the complaint to the central code authority for the appropriate industry for its information and for such action as it may be able to take in cases where there is a code authority organized and functioning. If it is not yet organized or functioning, Mr. Davis stated, the complaint will be referred to the deputy administrator in charge of that code for such action as he may be able to take.

If the code authority or the deputy or divisional administrator is unable to effect an adjustment, the complaint will be referred to the National Compliance Board as an unadjusted complaint. In its discretion, the National Compliance Board may refer the case to the appropriate enforcement agency of the Government—the Department of Justice or the Federal Trade Commission.

"This plan provides adjustment machinery for an industry while it is organizing adjustment machinery for itself, where it finds adjustment machinery too expensive and burdensome or where it needs the aid of Government machinery," said Mr. Davis. "The whole system is designed to provide for an easy transition of industrial self-government, at the same time insuring the quick elimination of non-compliance due to misunderstanding and the prompt prosecution of willful non-compliance. The aim of NRA is to give the code authorities the widest possible range of self-government subject to the ultimate responsibility of the Administration."

NRA Takes Over More Codes

The NRA is adjusting itself to make quick disposal of some 455 industrial codes which it has taken over from the AAA. This came about as the result of the President's action in removing all AAA codes, except those relating to the first processing of agricultural products, to the NRA. The President acted because of a disagreement in the Department of Agriculture between radical "brain-trusters" and a more conservative element, headed by George N. Peek, AAA director. Only four codes had been acted upon, while the NRA, with some 1200 codes submitted, has passed on and has approved approximately 150 codes.

Merit Clause Attacked

Controversies over the merit clause, price-fixing, definitions, representation on code authorities, reduction of working time and limitation of production featured a number of code hearings last week. The merit clause was attacked by labor at the hearing on the code for the steel plate fabricating industry. President William McGinn of the International Union of Structural Steel Workers asked that the code be rejected on the ground that all phases of the industry under consideration were covered by other codes already in existence.

Price-fixing and definitions were points of argument in connection with the hearing on the code for the saw and steel products manufacturing industry. Differences of opinion over mutual representation on code authorities developed at the hearing on the code for the non-ferrous foundry industry and railroad brass car and locomotive journal bearings and castings manufacturing industry. Proposed reduction in work-week and limiting operation of production machinery was a matter of contention on amendments offered to the code for the cast iron soil pipe industry.

Rejection of Plate Code Asked

The code for the steel plate fabricating industry was presented by a committee composed of Murrel J. Trees, Chicago; W. T. Ingalls, Birmingham, Ala., and W. F. Perkins, Baltimore. It establishes a 40-hr. week, with minimum wages of 40c. an hour in the North and 30c. an hour in the South.

After asking for rejection of the code, Mr. McGinn charged that an "effort is being made in connection with codes for the steel construction and fabricating industries to defeat organization and unionization" in industries. He asked that, in case the code was approved, it be amended to exclude erection operations. In direct conflict with this suggestion, J. N. Davis, speaking for the Boilermakers' Union, asked that erection and fabrication both be included. Mr. Davis asked that the minimum wage be put at 40c. in the North and 34c. in the South.

Several objections to the code were made by Gilbert H. Montague of the Baldwin Locomotive Works, and C. D. Conley, representing the structural steel and fabricating industry. After the meeting conferences were held to whip the code into final form.

Saw Makers Face Business Decline

Saw manufacturers have met a steadily declining demand for their product year by year since 1906 and the decline will last "for at least the lifetime of the present generation," Assistant Deputy Administrator George S. Brady was told at the hearing on the code of the Saw Manufacturers' Association, presented by its president, William J. Disston. The condition of the industry was attributed to the decline in lumber consumption. Considerable discussion arose over the definition of the industry. C. M. Dinkins, counsel for the Fabricated Metal Products Federation, insisted that the "loosely drawn" definition would draw his clients under the code when they already have their own code approved by the President. A meeting was subsequently held to arrive at a satisfactory solution of the question.

Sharp disagreement over any at-

tempt at price-fixing also developed, Walter C. Hecker, St. Louis, stating that nowhere in the National Recovery Act could he find any provision for price-fixing. Mr. Hecker also pointed out that his business would in the end be subject to six and possibly seven different codes, and said that if each code authority fixed upon a different method of cost accounting it would place him in a most embarrassing position.

In the hearing on the code of fair competition for the metal lath manufacturing industry, C. F. Henning, president of the Metal Lath Manufacturers' Association, said that the volume of business in 1933 has been 12.7 per cent of the productive capacity. The great slump in volume, he said, was due to the small amount of building construction throughout the country.

The Metal Lath Jobbers' Association indorsed article 6 of the code authorizing the code authority to prepare a merchandising plan, subject to approval of the administrators. It was requested that the plan be made mandatory.

Steel Castings Code Praised

The code of fair competition for the steel castings industry has been found "to be eminently practical, satisfactory and fair to producers of steel castings, workmen engaged in the industry and consumers of steel castings," according to a report made by the industry at a meeting in Cincinnati, Nov. 28, and made public by the NRA. In operation less than one month when the meeting was held, the industry said it had been convinced of the efficacy of the code and its "pronounced value" in speeding the industry's return to "normal, satisfactory and profitable operation."

The report, transmitted to President Roosevelt and the NRA, follows closely the one made on the operation of the steel code. The former was made in the form of a resolution unanimously adopted at the Cincinnati meeting by representatives of more than 100 companies and 85 per cent of the industry's productive capacity and was submitted by Merrill G. Baker, executive vice-president of the Steel Founders' Society of America, the code authority of the industry.

Roane Iron Co. Is Reorganized

THE ROANE IRON CO., Chattanooga, Tenn., owner of two blast furnaces and iron and coal mines at Rockwood, Tenn., has been taken over by the Roane Iron & Coal Co., Inc., Rockwood, a recently organized company. The latter expects to operate some of the properties. R. C. Cranford is one of the incorporators of the new company.

PWA Loans Will Finance Purchase of 12,775 Freight Cars—Others Likely

WASHINGTON, Dec. 12.—Purchase of 12,775 freight cars, 167 passenger cars and 30 locomotives will be made by four railroads with PWA allotments of $36,307,500 announced by Harold L. Ickes, public works administrator. Without specifying the equipment to be bought, it was stated that the Chesapeake & Ohio was allotted $18,065,000; the Erie Railroad, $11,964,000; the New York, Chicago & St. Louis, $5,028,500 and the Northern Pacific, $1,250,000. To indicate that the railroads are now entering upon purchases through PWA loans, it was pointed out that the total allotments had reached $176,807,500. The PWA has indications that there may be applications from other railroads for loans with which to purchase 8300 freight cars, 133 locomotives, 21 passenger cars, 10 suburban trains and one gas-electric car.

Bids Being Taken

The Northern Pacific has received bids on the equipment it will buy, presumably locomotives. The Erie and Nickel Plate already have requested competitive bids on the equipment they intend to buy and the C. & O. will ask for bids on its equipment as soon as it is possible to do so. Outlays for materials have been estimated as follows: Erie, $8,375,000; C. & O., $5,419,500; Nickel Plate, $1,508,500; Northern Pacific, not estimated.

The allotments are subject to the approval of the Interstate Commerce Commission and consummation within a reasonably short time of contracts satisfactory to the PWA and the four railroads.

Other railroad allotments already announced by the PWA are $84,000,000 to the Pennsylvania Railroad to be used for completing electrification of its New York-Washington line and doing miscellaneous construction work; a blanket allotment of $51,000,000 to be loaned to a number of carriers for purchasing new rails; loans of $3,500,000 and $2,000,000 respectively to the New York, New Haven & Hartford and the Lehigh Valley for car rebuilding.

New Haven to Reemploy Many

The loan to the New Haven will enable it to reemploy 700 men in its shops at Readville, Mass., and Van Nest, N. Y., while materials to be purchased will provide at least twice as much indirect industrial employment. The loan to the Lehigh Valley will enable that company to operate its shops at Sayre and Packerton, Pa., for five or six days a week instead of two days as at present. The loans to the New Haven and Lehigh Valley are the only ones so far made by the PWA for reconditioning equipment already owned. However, Mr. Ickes said that managements of a number of important lines have advised the PWA that they intend to provide additional employment for their shop men this winter on maintenance work to be done with PWA loans or with their own funds.

Chicago Gets $34,000,000

An allotment of $33,948,000 by the PWA to the Sanitary District of Chicago was included in total allocations aggregating $41,588,269 for 63 more non-Federal projects. The Chicago allotment supplements a previous one of $8,000,000 for its sanitary district project and is contingent upon the fulfillment of agreements to secure legislation authorizing the fixing of charges for treatment of trade wastes, etc. It is also subject to an agreement that disbursements be made under the supervision of engineers appointed by the Government and that treatment works will be constructed in accordance with the engineering survey made under Federal supervision.

Other contingencies to be met indicate considerable delay before the work is begun. The construction will include four sections of the West Side intercepting sewer, completion of the Calumet intercepting sewers, three additional sections of the West Side intercepting sewer and pumping station, blower house, two batteries of aeration tanks and the necessary connecting conduits for the West-Southwest Side sewage treatment works.

These allotments brought the total for scattered projects to approximately $566,000,000. Most of them are to be undertaken by States, municipalities or other public agencies. A few allotments have been made to private corporations for construction of projects that will be devoted to public use. Administrator Ickes said that reports coming to the PWA's state engineers show that actual construction is getting under way on an increasing number of these non-Federal projects.

Huge Sum Might Be Spent

The somewhat staggering sum of $14,000,000,000 could be spent in a two-year construction program to aid the capital goods and real estate industries, according to a report by National Recovery Administrator Hugh S. Johnson to the public works administrator. However, the General emphasized the fact that the report is simply a statistical analysis made un-

der the Recovery Act by the research and planning division of the NRA.

Recommendation was said to have been made for the establishment of a $2,000,000 fund to start a national real estate inventory, part of which would be assigned to New York, Philadelphia, Cleveland and St. Louis for residential construction, to be followed by similar activities in other cities. It is estimated that there is need for the construction of 800,000 residences annually for the next few years.

Barge Owners Protest Steel Code Rulings

ALLEGING that operation of barge line cargoes of iron and steel on the Ohio and Mississippi rivers has been stopped by freight rate restrictions in the iron and steel code, the Ohio Valley Improvement Association has demanded a modification of the code. W. C. Culkins, executive secretary, is pressing the matter with NRA officials at Washington, presumably at the instigation of the steel companies which operate on the Ohio and Mississippi rivers. According to a letter received yesterday from K. M. Simpson, division administrator at Washington in charge of the steel code, the protest is receiving careful study by the authority and the American Iron and Steel Institute.

"River men say," according to Mr. Culkins, "that the code ruling practically stops navigation of the river by barge lines which depend on iron and steel cargo for their sustenance. They claim it was inspired by the steel firms which have no barge lines or river terminals and the railroads themselves. Barge line owners, such as Jones & Laughlin and the Carnegie Steel companies, think they should be allowed deductions for transportation by inland waterways; and cannot see the justice of their being forced out of the barge line business by a code drafted by the American Iron and Steel Institute.

"From a business standpoint the whole transaction looks peculiar. The Government spent $100,000,000 on the Ohio River improvement and another Federal agency has come along which makes this huge expenditure practically worthless."

November Coke Output Higher

PRELIMINARY November coke statistics indicate a total output of 35,335,000 tons, or 1,430,896 tons daily, as compared with the revised October total of 34,412,000 tons, or 1,331,131 tons daily. In November, 1932, production aggregated 34,984,400 tons, representing 1,447,131 tons per working day.

Manufacturers Approve President's Policies, But with Reservations

THE Government's monetary program was upheld as an interim policy and the national recovery program was approved as a temporary expedient in resolutions adopted by the National Association of Manufacturers in its annual convention at New York, Dec. 7 and 8.

While going on record as unequivocally opposed to currency inflation through the use of printing press money and to any form of bimetallism, the association recognized that "the wise adjustment of the monetary standard of the United States to the changed economic conditions arising out of the world war and the ensuing decade of rapid expansion is one of the vital factors in the President's recovery program." It was pointed out that the monetary problem is "extremely complicated and abstruse" and involves issues of "such delicacy, both from a national and international viewpoint," that public announcement, in advance, of details of the Government's policy might prevent the President from attaining his objectives.

But it was recommended that he give the nation definite assurance that there will be an ultimate return to the gold standard, even though the gold content of the dollar is modified, and, further, that he take such action as soon as he believes that it can be done without jeopardy to the people of the United States.

Accept NRA as Temporary and Not Permanent

In its resolution covering the National Industrial Recovery Act the association pledged itself "to make every rational effort to cooperate in and to test fairly experimental legislation under which industry has been placed by the Congress," but reserved the right to offer "constructive criticism as defects in the policy or plans of operation appear or as administrative improvement may be suggested."

It was pointed out that the "limited term of the NRA makes present legislation a temporary and not a permanent policy,!" and it was emphasized that lasting recovery depends on a revival of private enterprise and not upon a continuing enlargement of governmental activity and control in the field of private enterprise.

It was urged that industry be granted "the fullest measure of policy determination through self-organization and self-government compatible with the fair protection of the public interest," and it was recommended that employment problems be solved by direct relations between management and workers and not in an uniformed forum outside of industry.

Further Cuts in Hours Opposed

Further cuts in hours and advances in wage rates were opposed on the grounds that they would widen the disparity between the prices of agricultural and industrial products. "Expansion in industrial employment," the resolution stated, "cannot be obtained except as manufactured products move freely into consumption in all directions."

The resolution also voiced the association's opposition to any legislation prescribing a rigid maximum work week on the grounds that flexibility in this respect is essential.

General Hugh S. Johnson also emphasized the danger of further cuts in working hours, in addressing the convention on Dec. 7. "I believe," he said, "that we shall eventually find necessary a shorter week than any in the codes. But we must not destroy our industries for an economic ideal. We have stood and shall continue to stand against any reduction in hours that will ruin any industry."

Jordan Denies Effectiveness of Recovery Program

The general also contended that the return of upward of 4,000,000 people to work was evidence of the success of the recovery program. Virgil Jordan, president of the National Industrial Conference Board, who also addressed the convention, took issue with the recovery administrator.

Dr. Jordan stated that recovery got under way throughout the world in the summer of 1932. There was an interruption in the movement in this country, because of the weakness of gold prices under the impact of sterling competition, because of the presidential election and, finally, because of the interregnum between the election and the inauguration which finally led to the banking moratorium and the suspension of gold payments. But this merely accentuated the recovery movement when it was resumed. The abnormal rise which extended through July was followed by a reaction in which about half the ground gained was lost.

Our present position, he said, is substantially the same as it would have been if the world-wide process of recovery had been carried forward in the United States during the past 18 months without the influence of accidental or circumstantial political factors. "An impartial economic analysis of the statistical record of business movements here and abroad during

the past year and a half," he declared, "compels the conclusion that the specific economic policies of the new administration have had little, if any, effect upon the process of recovery in the United States."

Monetary Policy Debated

In a debate on the Government's monetary policy Dr. Ray B. Westerfield, Yale University, advocated an immediate return to the gold standard, while Frank A. Vanderlip, former president, National City Bank of New York, upheld the President's program. Dr. Westerfield contended that there is little if any reason for believing that manipulating gold prices will constantly vary the price level of the country. The whole theory of the commodity dollar, he declared, rests upon a mechanical conception of the relation of gold upon prices that is unproved. While admitting that gold buying might have a long-time effect on prices, he denied that it would have any influence in one year, two years, or even in a business cycle.

Mr. Vanderlip said that the gold dollar was never a standard of value but was merely a standard of weight. The buying power of the dollar had varied widely, he pointed out. While admitting that the gold standard had worked well for a century, he contended that changed conditions since the war made it unworkable now without modification. He explained how the gold standard had formerly functioned domestically as a limiting influence on currency emissions and credit expansion and, internationally, as a means of settling international trade balances. At present, it cannot function normally as a world trade equalizer because of the existence of ten billion dollars in liquid capital which moves quickly from one country to another for reasons that have no relation to international trade movements.

Mr. Vanderlip denied that he favored abandonment of the gold standard, but said that he wanted "to restore to it the duties that it can comply with, give it a task that it can fulfill and not lay on it obligations that it is impossible to meet." He suggested that the country be placed on a bullion standard, under which domestic withdrawals would be limited to gold bars worth $5,000 or more each and international withdrawals would be restricted rigidly to trade settlements.

Principally because of the heavy demand from munitions and armament manufacturers, the Japanese iron and steel industry has been very active throughout the current year. In addition to production gains, imports and exports of steel products show substantial increases over last year, and the operating returns of many manufacturers are considered very satisfactory.

Industrial Traffic League Makes Transportation Recommendations Public

THE National Industrial Traffic League has forwarded to Joseph B. Eastman, Federal Coordinator of Transportation, answers to questions concerning transportation regulation and coordination submitted to shippers generally by the coordinator's office on Nov. 4. The league takes the position that, while permissive legislation for buses and trucks, airlines, and other means of transportation competitive with railroads might well be recommended to the coming session of Congress by the coordinator, parity of regulation between the railroads and these newer instrumentalities is not practical at the present time.

Among the most vital of the suggestions of the league is that the fourth section of the Interstate Commerce Act—the so-called long-and-short-haul clause, bone of contention between the railroads and Middle-Western and Coast shippers on the one hand and the so-called Inter-Mountain territory interests on the other—be repealed altogether. Highlights of the league's advisory document are as follows:

That the "same character of regulation" should not be applied to the railroads on the one hand and competing methods of transportation on the other.

That the trend toward parity in regulation as between the railroads and other agencies should be by releasing the railroads "from much of their present Federal regulation and leaving all agencies free of such regulation."

That restrictions against the railroads meeting competitive rates of other agencies on short notice be materially loosened.

That Federal power over minimum rates be restricted to cases where it is found that "lower rates would result in an actual burden on other traffic."

That the statutes against undue preference and unjust discriminations in rates be interpreted more liberally and that section 4 as mentioned above be repealed entirely.

That the laws against the ownership of competitive water lines by railroads be retained, as well as those which forbid the railroads to own inland waterway facilities.

That, while railroads should be permitted to make joint rates for through hauls involving rail, water, highway and other transportation facilities, and should be permitted to acquire other agencies to supplement their own facilities, they should not be permitted to acquire "competitive agencies" nor should joint rates as described be made mandatory.

That interstate motor truck and motor bus transportation should not be regulated in the manner that railroads are now regulated. Such legislation should be largely permissive in character, although compulsory liability insurance on the part of all carrier agencies is desirable.

That, although commercial highway vehicles should be required to pay in taxes their fair share of the cost and maintenance of the highways, it seems probable that their present taxation is partially sufficient and that it is necessary for privately owned vehicles to be made to bear their share in these costs through taxation.

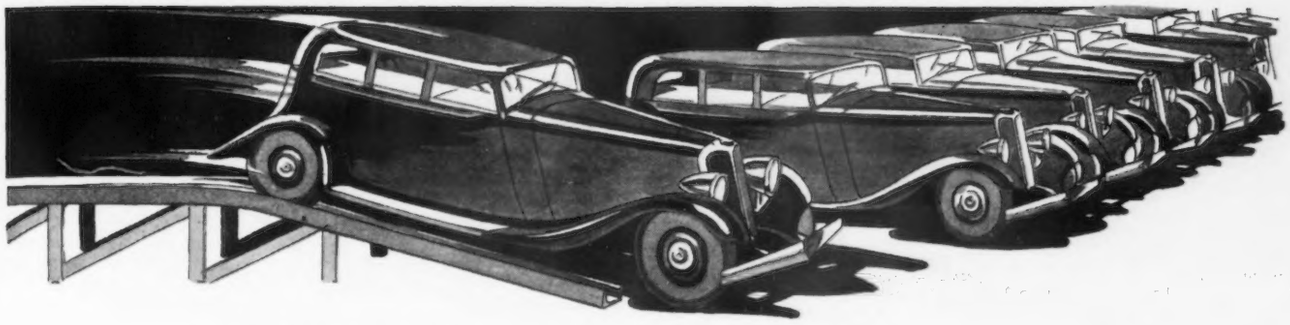
That no further regulatory restrictions should be placed on domestic water lines and that no tolls should at present be levied against the traffic carried on such lines.

Empire Sheet Appoints Chicago Sales Agents

EMPIRE SHEET & TIN PLATE CO., Mansfield, Ohio, has appointed Taubensee & Richards, 400 West Madison Street, Chicago, as district sales representatives in the Chicago territory. Henry A. Taubensee, senior member of the firm, was formerly associated with the Canton Art Metal Co., Canton, Ohio, and later with the Massillon Rolling Mill Co., Massillon, Ohio, now a part of the Republic Steel Corpn., being sales manager of the Massillon company until 1919, when he went to Chicago to engage in business for himself. He retired from the Chicago firm in 1925, leaving it in the hands of Edward J. Taubensee and Donald M. Richards, and became general sales manager for the Superior Sheet Steel Co., Canton, Ohio. In 1927 when this company was merged with the Continental Steel Corpn., Kokomo, Ind., he went to Kokomo as vice-president and general sales manager. He held that position until January, 1930, when he returned to Chicago to resume the business he had founded.

J. M. Watson, Jr., has been appointed district sales representative of the Empire company in Youngstown. For 10 years he has operated a sheet steel sales office in the First National Bank Bldg., Youngstown.

For every 31-gal. barrel of beer that is brewed, about ¼ ton of refrigeration is required together with 1.5 kw. of electrical energy and 800 lb. of steam. These data were given by Victor Buhr, vice-president, Equity Construction Co., New York, in a paper presented to the American Society of Mechanical Engineers, to indicate the opportunities for the mechanical engineer in the brewing industry. Power and other services include water treatment, measuring and controlling instruments, a balancing of the steam load, perhaps through the use of accumulators, and air conditioning, though the last item is principally a future requirement.



▲▲▲ THIS WEEK ON THE ASSEMBLY LINE ▲▲▲

Ford Sets Pace for Industry With His New V-Eight Car

DETROIT, Dec. 12.

MR. FORD'S competitors have derived much amusement from time to time because of his delay in making changes and because of his tenacity in holding to ultra-conservative merchandising methods. They must have rubbed their eyes in amazement last week as they watched him introduce his new V-eight for 1934 in the most modern manner. For the first time in the industry's history he is the first large volume producer to come out with new models and to be in a position to make prompt deliveries.

No resources were left untouched to make the introduction of the new Ford a notable occasion. Newspaper and business paper representatives were the guests of Henry and Edsel Ford at the first press preview ever staged by the company. Mr. Ford spoke to his 7000 dealers by means of an international telephone hook-up. A nine-reel motion picture, "These Thirty Years," depicting the development of the Ford car, was shown to selected audiences, including dealers, at a local theater. The Ford Exposition of Progress opened a two-weeks' stay in New York. A national advertising campaign of impressive proportions was inaugurated.

Detroit is convinced that Mr. Ford has gone over the top in a drive to recover some of the ground lost in the past year. Chevrolet and Plymouth may have thought that all they had to do was to keep each other in check, but today they find that they have a reenergized Mr. Ford with whom to deal. The Ford company has stripped itself of uneconomical practices and antiquated selling methods, is in the best fighting trim in years, and the industry's keenest observers think it is "going places."

The engine power of the new Ford has been increased 12 per cent and the pick-up improved by a new dual down-draft carbureter and dual intake manifold. A ventilation system has been built into the body. When ventilation is desired, the window glass is raised to the top and the handle given an added half turn. This slides the glass back horizontally to form a narrow slot between the glass and the frame. Through this slot air is drawn out by the forward motion of the car.

While the radiator shell and grille have been redesigned, the exterior appearance of the car differs only slightly from model 18. A new enamel finish is used on all bodies. Fenders on de luxe cars now are in color to harmonize with the body.

Transverse springs have been retained. The likelihood that any form of independent suspension of front wheels will be adopted the coming year is considered remote. The chief purpose of the new systems used by competitors is to give greater riding comfort and to prevent jolting. Ford engineers point out that present design of Ford springs tends to prevent the body from tilting on uneven roads. It permits free and easy action of all four wheels because the springs are attached to the axles at their outer flexible tips.

The most radical departure in the way of materials in the new car is a cast alloy steel crankshaft which is made by the Ford company at the Rouge plant. The cast steel has been developed by Ford engineers. Its tensile strength is said to be much higher than that of the steel forging formerly used. The superiority of the new crankshaft in service is reported to be the primary reason why a cast shaft has been substituted for a forging. Ford is said to have had cast crankshafts in service for the past five years, and their records have been remarkable. The Ford camshaft is still a steel forging.

It is said that the manufacture of 150,000 of the new Fords in the next three months has been authorized by the management.

Industry Moving Slowly

Aside from Ford, the industry seems unable to throw off the shackles which are keeping it from moving ahead. Slowness in mastering new production processes, particularly front-end construction, and late delivery of dies are responsible for the delay. Production this month remains as obscure as it did a week ago. This means that the steel trade is resigning itself to the fact that no major purchases will be made this month by motor car makers. The buying which steel mills had anticipated the latter part of December will probably not materialize until the latter half of January. Despite the absence of further large commitments at this time, demand for steel is gradually widening, with automobile companies placing an increasing volume of small orders.

December Volume Low

Chevrolet is working toward a goal of 30,000 cars this month and Pontiac 7500, but it is believed that neither will attain its objective. Oldsmobile is understood to be held up because certain dies have not yet been completed. Cadillac has started manufacture, but has yet to assemble its initial car for 1934. Buick probably will turn out 5500 units in December with close to 8000 scheduled for January. The new Buick will be out Dec. 20.

A ride stabilizer, a spring steel bar mounted just ahead of the rear frame cross member, is said to prevent side sway or body roll when rounding curves or on highly crowned roads in the new Buick. The synchromesh transmission will have helical gears silent in all speeds. It is reported that running boards and fenders will be trimmed with rustless steel moldings. A tubular steel propeller shaft will replace a solid steel shaft.

Knee-action wheels, of course, will be the outstanding mechanical innova-

tion. On the Buick it is understood that the coil springs will be exposed, but will be protected by the deep sweep of the front fenders. Chevrolet, on the other hand, will have its coil springs inclosed in a casing made of strip steel. The new Buick will not differ radically in appearance from the 1933 car, except in the direction of streamlining. This change, however, will be in keeping with Buick's conservative policy.

Chrysler to Begin Assemblies

Dodge is expected to start operations on its 1934 cars this week and Plymouth next week. The best that these two Chrysler units can hope for is to get 15,000 cars into dealers' hands by the opening of the New York show on Jan. 6. In the first 11 months of 1933 Plymouth assembled 258,969 units, an increase of 147,750 cars over the same months of last year.

No recent car has attracted more attention in advance of its debut than the De Soto Airflow, the first truly streamlined car to go into volume production. While the Chrysler people admit that the presentation of this revolutionary model is a financial gamble, the industry's sales executives believe it will be successful.

Hudson, which will not announce its new lines until the New York show, will have a Terraplane six and a Hudson eight, the Terraplane eight having been dropped. Thus an effort will be made to restore the Hudson car to its former prominent position. The Hudson company, very optimistic about the coming year, is talking in terms of 200,000 units for 1934. Hudson's Axleflex front-end construction is the invention of the Baker Wheel & Rim Co., Detroit. Hudson is its licensee.

Hupmobile is passing through a reorganization similar to that which occurred at Hudson when Roy Chapin resumed active management of its affairs. Charles D. Hastings, highly respected figure in the industry, has returned to the direction of Hupp's activities. Three distributers have been added to the board. A small Hupmobile is reported to be in the offing.

Detroit Notes

The labor situation in southern Michigan continues delicate. Union agitators are known to be trying to stir up a strike among production workers in certain plants in order to tie up operations around Jan. 1 when a special effort is being made to sample dealers. However, a week or two ago manufacturers were more apprehensive than they are today. . . . . Interest in the machine tool trade is centering on prospective heavy purchases by Andre Citroen, French automobile maker. . . . . Representatives of the Peugeot company are still in Detroit and are expected to place some equipment orders shortly. . . . . Ford's advance in prices of the new V-eight, ranging from $5 to $30, probably will be about the average for the entire low-price field. The increases are not likely to cover the entire additional production costs under the code, part of the difference being made up by larger volume. . . . . Nothing illustrates better the thorough clean-up of dealers' stocks of 1933 models than the November figures of General Motors Corpn. Its dealers sold to consumers 35,417 cars and bought from the various factories only 3483 units. . . . . A prominent manufacturer today has less than 1000 cars in the hands of about 2500 dealers. It has been short of certain types of cars since July. . . . . November output of members of the industry, excluding Ford, totaled 47,052 units, according to the N.A.C.C. This compares with 32,289 units in November, 1932, and 101,082 cars in October. . . . . During the first 11 months of the current year production amounted to 1,451,363 units, as against 893,095 units in the similar months of last year.

Steel Ingot Production Registers 27 Per Cent Decline in November

PRODUCTION of open-hearth and Bessemer steel ingots in November amounted to 1,540,882 gross tons, according to the American Iron and Steel Institute, which represented a decline of 27 per cent from the 2,111,842 tons produced in the preceding month. November's daily rate of output in the 26 working days was only 59,265 tons, or 27.26 per cent of capacity, compared with 81,225 tons, or 37.37 per cent in October. Production in November, 1932, was 1,032,221 tons, or 39,701 tons daily, engaging the industry's available capacity at 18.36 per cent.

In the first 11 months of 1933, steel ingot output amounted to 21,057,319 tons, compared with 12,461,799 tons in the corresponding 1932 period and with 13,322,833 for the entire year.

PRODUCTION OF OPEN-HEARTH AND BESSEMER STEEL INGOTS
(Gross Tons)
Reported for 1933 by Companies Which Made 96.57 Per Cent of 1932 Ingot Output

1933	Open-Hearth	Bessemer	Calculated Output All Companies Monthly	Calculated Output All Companies Daily	No. of Working Days	Per Cent Operation
January	885,743	109,000	1,030,075	39,618	26	18.23
February	922,806	126,781	1,086,867	45,286	24	20.83
March	784,168	94,509	909,886	33,699	27	15.50
April	1,180,893	135,217	1,362,856	54,514	25	25.08
May	1,716,482	216,841	2,001,991	74,148	27	34.11
June	2,211,657	296,765	2,597,517	99,904	26	45.96
July	2,738,083	355,836	3,203,810	128,152	25	58.95
August	2,430,750	370,370	2,900,611	107,430	27	49.42
September	1,991,242	240,473	2,310,982	88,884	26	40.89
October	1,847,773	191,673	2,111,842	81,225	26	37.37
November	1,331,091	156,939	1,540,882	59,265	26	27.26
Eleven months	18,040,648	2,294,404	21,057,319	73,885	285	33.99

The figures of "per cent of operation" are based on the annual capacity as of Dec. 31, 1932, of 67,386,130 gross tons for Bessemer and open-hearth steel ingots.

PRODUCTION OF OPEN-HEARTH AND BESSEMER STEEL INGOTS
(Gross Tons)
Reported for 1932 by Companies Which Made 93.71 Per Cent of 1931 Ingot Output

1932	Open-Hearth	Bessemer	Calculated Output All Companies Monthly	Calculated Output All Companies Daily	No. of Working Days	Per Cent Operation
January	1,230,907	160,633	1,484,991	57,115	26	26.41
February	1,230,970	157,067	1,481,253	59,250	25	27.40
March	1,149,193	193,944	1,433,337	53,087	27	24.55
April	1,036,163	144,197	1,259,629	48,447	26	22.40
May	950,838	103,593	1,125,243	43,279	26	20.01
June	755,068	100,249	912,757	35,106	26	16.23
July	653,039	102,916	806,722	32,269	25	14.92
August	696,122	97,323	846,730	31,360	27	14.50
September	804,470	124,970	991,858	38,148	26	17.64
October	885,773	132,876	1,087,058	41,810	26	19.33
November	838,419	128,844	1,032,221	39,701	26	18.36
December	724,917	81,932	861,034	33,117	26	15.31
Total	10,955,879	1,528,544	13,322,833	42,701	312	19.75

The figures of "per cent of operation" are based on the annual capacity as of Dec. 31, 1931, of 67,473,630 gross tons for Bessemer and open-hearth steel ingots.

Releases Against Expiring Contracts Bolster Steel Production

Industry Expects to Feel Combined Effect of Railroad, Automobile and Public Works Demands in First Quarter—Scrap Advances

PRODUCTION in the iron and steel industry has made another contra-seasonal gain, largely because of a bulge in shipping orders against expiring contracts. Under the steel code, all contract tonnage remaining unshipped on the final day of a calendar quarter is automatically cancelled. On products which have been advanced in price there is every incentive to take full shipments against commitments made at lower figures. This is particularly true of products like pig iron and bars, plates and shapes for which contracts at pre-code prices are still in force.

In the case of materials which have not been advanced in price for the first quarter the approaching inventory period is having the customary effect of holding back orders. Deferred replenishment of stocks in these products will tend to offset anticipatory accumulations dictated by price considerations.

RAIL orders have not yet affected production except in the South, where the Ensley mill has resumed operations and six additional open-hearth furnaces have been lighted. Northern mills which participated in the Pennsylvania Railroad's distribution of 100,000 tons of rails do not expect to start rolling the steel until late in the winter.

It is precisely because so much maturing business will not reach the mills until next year that the outlook for the first quarter is regarded as so promising. Delays affecting rail and railroad equipment business are matched by further impediments in the automobile program. Late delivery of dies and slowness in mastering new production processes, particularly front-end construction, have held back motor car output to such an extent that major purchases of steel which had been expected the latter part of this month may not reach the mills until the last half of January. But there is nothing to prevent a sharp upturn of automobile production, once preliminary operating difficulties are solved, unless labor unrest, stirred up by consistent agitation, should result in further organized disturbances. In fact, lingering labor difficulties in Michigan, in the captive coal mines and in the West Virginia steel mills constitute the only ominous element in a situation which promises to make the first quarter a period in which the steel industry will feel the full combined force of automobile, public works and railroad demands.

OF the 12,775 freight cars, 167 passenger cars and 30 locomotives for which the Van Sweringen roads and the Northern Pacific have sought Government financing, none has yet been inquired for, according to the railroad equipment trade, except motive power for the Hill line. The New Haven plans to overhaul and recondition 900 cars, to air-condition 102, and to repair and paint 210 all-steel multiple unit coaches.

Perplexing to railroads, which have been accustomed to divide their rail orders among a number of mills, is the insistence of the transportation coordinator that tonnage be bought at the lowest delivered cost. Since rails are quoted on an f.o.b. mill basis instead of a delivered basis, all mills except those closest to a given road might be technically regarded, under the code, of reducing their prices if they absorbed the freight advantage enjoyed by the nearest producer. Compliance with the coordinator's instructions will mean allocation of all rail business on a strictly geographical basis unless the steel code is amended.

PUBLIC works are predominant in current structural steel awards, which total 28,300 tons, compared with 22,300 tons a week ago.

A rise in American steel export business is being felt abroad, particularly by Welsh tin plate mills. Nevertheless, British production gained in November, pig iron output being 374,900 tons, compared with 373,300 tons in October and the steel ingot total being 695,000 tons as against 668,300 tons.

PRICES of bolts, nuts and rivets have been reaffirmed for the first quarter except for a 10 per cent advance on stove bolts. Higher prices on heavy melting steel at Pittsburgh and Chicago have raised THE IRON AGE scrap composite from $10 to $10.25 a ton. The pig iron and finished steel composites are unchanged at $16.90 a ton and 2.028c. a lb. respectively.

As against a steel production schedule at the beginning of the week of 31.5 per cent, current operations are estimated by THE IRON AGE as 30½ per cent, compared with 27½ per cent a week ago. Gains of two points at Pittsburgh to 24 per cent, two points at Chicago to 26 per cent, three points in eastern Pennsylvania to 22 per cent, eight points to 47 per cent at Cleveland, five points to 27 per cent at Buffalo and 25 points to 50 per cent in the South, are partly offset by a 10-point decline to 40 per cent in the Wheeling district.

▲▲▲ A Comparison of Prices ▲▲▲

Market Prices at Date, and One Week, One Month, and One Year Previous
Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron

	Dec. 12, 1933	Dec. 5, 1933	Nov. 14, 1933	Dec. 13, 1932
Per Gross Ton:				
No. 2 fdy., Philadelphia	$19.26	$19.26	$18.26	$13.34
No. 2, Valley furnace	17.50	17.50	17.50	14.50
No. 2 Southern, Cin'ti	18.13	18.13	18.13	13.82
No. 2, Birmingham	13.50	13.50	13.50	11.00
No. 2 foundry, Chicago*	17.50	17.50	17.50	15.50
Basic, del'd eastern Pa.	18.76	18.76	17.76	13.50
Basic, Valley furnace	17.00	17.00	17.00	13.50
Valley Bessemer, del'd P'gh	19.76	19.76	19.76	16.89
Malleable, Chicago*	17.50	17.50	17.50	15.50
Malleable, Valley	17.50	17.50	17.50	14.50
L. S. charcoal, Chicago	23.54	23.54	23.54	23.17
Ferromanganese, seab'd carlots	82.00	82.00	82.00	68.00

*The switching charge for delivery to foundries in the Chicago district is 60c per ton.

Rails, Billets, etc.

Per Gross Ton:				
Rails, heavy, at mill	$36.37½	$36.37½	$36.37½	$40.00
Light rails, Pittsburgh	32.00	32.00	32.00	30.00
Rerolling billets, Pittsburgh	26.00	26.00	26.00	26.00
Sheet bars, Pittsburgh	26.00	26.00	26.00	26.00
Slabs, Pittsburgh	26.00	26.00	26.00	26.00
Forging billets, Pittsburgh	31.00	31.00	31.00	31.00
Wire rods, Pittsburgh	36.00	36.00	35.00	37.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.60	1.60	1.60	1.60

Finished Steel

Per Lb:	Cents	Cents	Cents	Cents
Bars, Pittsburgh	1.75	1.75	1.75	1.60
Bars, Chicago	1.80	1.80	1.80	1.70
Bars, Cleveland	1.80	1.80	1.80	1.65
Bars, New York	2.08	2.08	2.08	1.95
Tank plates, Pittsburgh	1.70	1.70	1.70	1.60
Tank plates, Chicago	1.75	1.75	1.75	1.70
Tank plates, New York	1.98	1.98	1.98	1.898
Structural shapes, Pittsburgh	1.70	1.70	1.70	1.60
Structural shapes, Chicago	1.75	1.75	1.75	1.70
Structural shapes, New York	1.95¼	1.95¼	1.95¼	1.86775
Cold-finished bars, P'gh	2.10	2.10	1.95	1.70
Hot-rolled strips, Pittsburgh	1.75	1.75	1.75	1.45
Cold-rolled strips, Pittsburgh	2.40	2.40	2.40	2.00

Finished Steel

Per Lb:	Dec. 12, 1933 Cents	Dec. 5, 1933 Cents	Nov. 14, 1933 Cents	Dec. 13, 1932 Cents
Hot-rolled annealed sheets, No. 24, Pittsburgh	2.25	2.25	2.25	2.10
Hot-rolled annealed sheets, No. 24, Chicago dist. mill	2.35	2.35	2.35	2.20
Sheets, galv., No. 24, P'gh	2.85	2.85	2.85	2.85
Sheets, galv., No. 24, Chicago dist. mill	2.95	2.95	2.95	2.95
Hot-rolled sheets, No. 10, P'gh	1.75	1.75	1.75	1.55
Hot-rolled sheets, No. 10, Chicago dist. mill	1.85	1.85	1.85	1.65
Wire nails, Pittsburgh	2.35	2.35	2.10	1.95
Wire nails, Chicago dist. mill	2.40	2.40	2.15	2.00
Plain wire, Pittsburgh	2.20	2.20	2.10	2.20
Plain wire, Chicago dist. mill	2.25	2.25	2.15	2.25
Barbed wire, galv., Pittsburgh	2.85	2.85	2.60	2.60
Barbed wire, galv., Chicago dist. mill	2.90	2.90	2.65	2.65
Tin plate, 100 lb. box, P'gh	$5.25	$5.25	$4.65	$4.25

Scrap

Per Gross Ton:				
Heavy melting steel, P'gh	**$12.00**	$11.50	$11.50	$8.75
Heavy melting steel, Phila	10.00	10.00	9.75	6.75
Heavy melting steel, Ch'go	**8.75**	8.50	8.75	5.25
Carwheels, Chicago	**9.50**	9.00	9.00	7.00
Carwheels, Philadelphia	10.75	10.75	10.75	8.50
No. 1 cast, Pittsburgh	11.25	11.25	11.25	9.50
No. 1 cast, Philadelphia	11.25	11.25	11.25	8.00
No. 1 cast, Ch'go (net ton)	8.50	8.50	8.50	6.25
No. 1 RR. wrot., Phila	11.00	11.00	11.00	7.50
No. 1 RR. wrot., Ch'go (net)	**7.50**	7.25	7.25	4.00

Coke, Connellsville

Per Net Ton at Oven:				
Furnace coke, prompt	$3.75	$3.75	$3.75	$1.75
Foundry coke, prompt	4.25	4.25	4.25	2.75

Metals

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Electrolytic copper, refinery	7.75	7.75	8.00	4.75
Lake copper, New York	8.00	8.00	8.25	5.00
Tin (Straits), New York	*52.65*	53.75	55.20	22.55
Zinc, East St. Louis	4.50	4.50	4.50	3.12½
Zinc, New York	4.85	4.85	4.85	3.49½
Lead, St. Louis	4.05	4.05	4.15	2.87½
Lead, New York	4.15	4.15	4.30	3.00
Antimony (Asiatic), N. Y.	7.25	7.25	7.20	5.40

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

▲ ▲ ▲

▲▲▲ The Iron Age Composite Prices ▲▲▲

	Finished Steel	Pig Iron	Steel Scrap
Dec. 12, 1933	2.028c. a Lb.	$16.90 a Gross Ton	$10.25 a Gross Ton
One week ago	2.028c.	16.90	10.00
One month ago	2.015c.	16.61	10.00
One year ago	1.948c.	13.56	6.92
	Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strips. These products make 85 per cent of the United States output.	Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.	Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	Finished Steel High	Finished Steel Low	Pig Iron High	Pig Iron Low	Steel Scrap High	Steel Scrap Low
1933	2.036c., Oct. 3	1.867c., Apr. 18	$16.90, Dec. 5	$13.56, Jan. 3	$12.25, Aug. 8	$6.75, Jan. 3
1932	1.977c., Oct. 4	1.926c., Feb. 2	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.42, July 5
1931	2.037c., Jan. 13	1.945c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930	2.273c., Jan. 7	2.018c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.317c., April 2	2.273c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3
1928	2.286c., Dec. 11	2.217c., July 17	18.59, Nov. 27	17.04, July 24	16.50, Dec. 31	13.08, July 2
1927	2.402c., Jan. 4	2.212c., Nov. 1	19.71, Jan. 4	17.54, Nov. 1	15.25, Jan. 11	13.08, Nov. 22

Pittsburgh Output Rises Further to 24 Per Cent

Valley Production Unchanged at 35 Per Cent, But Wheeling District Rate Declines 10 Points to 40 Per Cent—Scrap Higher

PITTSBURGH, Dec. 12.—Steel mill activity in this district has increased further this week as producers hasten to make final fourth quarter deliveries before the deadline on Dec. 31. Although the stimulus for most of the increased specifications is traceable to products on which price advances will become effective on Jan. 1, nevertheless a genuine improvement in some consuming lines is reflected by several unexpected bookings of sheet and strip steel, which will remain quotably unchanged for next quarter.

A good deal of steel buying is undoubtedly being held back by the approaching inventory period, and many consumers who might ordinarily enter the market are deferring replenishment of stocks until after the year-end. Current demand for steel still lacks prominent support from the automotive industry, which has evidently not entirely rid itself of labor difficulties.

Enough general business is being specified, however, to lift ingot output this week in the Pittsburgh area to 24 per cent of capacity. Production in the Valleys and nearby northern Ohio mills is holding at 35 per cent. Operations in the Wheeling district have receded ten points to 40 per cent.

Railroad orders have not thus far figured in rolling schedules in the Pittsburgh district. Production of rails against the recent Pennsylvania Railroad order will probably not be started until late in the winter.

Scrap is apparently very firm, with No. 1 heavy melting steel up 50c. a ton at Pittsburgh.

Pig Iron

Except in cases where deliveries are being specified against old low-priced contracts, which must be completed by Dec. 31, consumers are practically ignoring this market. With current prices to continue through first quarter, no incentive to buy is apparent. Moreover, the wide spread between scrap and pig iron values continues to be a factor worthy of consideration in the shaping of purchasing programs. Although some large-lot buying of basic and Bessemer is considered long overdue, no major transactions in these grades have been reported during the present quarter.

Semi-Finished Steel

A further recession is noticeable in the movement of sheet bars to tin plate mills. Wire rods are moving somewhat faster. Forging bars are in fair demand. Most non-integrated mills are restricting consumption of semi-finished grades to yard stocks until after year-end inventories.

Bolts, Nuts and Rivets

Although official announcement of first quarter prices has not yet been made, producers will not make any changes in the current base prices for the coming period. Current discounts of 70 per cent on bolts and nuts, and 70 per cent and 10 per cent on small rivets will be continued for first quarter. Large rivets will remain unchanged at $2.75, base per 100 lb., Pittsburgh or Cleveland. A local producer has received an order from the Port of New York Authority for 1800 tons of bolts, nuts and washers for the Mid-town tunnel at New York. Delivery of this material will be made over an extended period.

Bars

Consumers are hastening to specify against 1.60c. contracts, which must be fulfilled by Dec. 31. The volume of such business has increased to the point where December tonnage is expected to top that of November. Spot demand is also livelier. Soft steel bars on Jan. 1 will be established on a single basis of 1.75c., Pittsburgh, for first quarter delivery.

Demand for reinforcing steel bars is enlivened by a more rapid appearance of public works projects. Road construction in Pennsylvania also accounts for a good share of current specifications. Private work is still at a minimum. Prices are quotably unchanged for December and first quarter delivery.

Plates and Shapes

All unspecified tonnage against fourth quarter plate contracts, most of which were placed at 1.60c., Pittsburgh, will be canceled on Dec. 31. There is a general disposition among buyers, however, to specify fully in anticipation of the general advance on Jan. 1, and rolling at some mills has consequently been accelerated to meet the delivery deadline. Fresh projects are relatively scarce. A large aggregate tonnage for railroad consumption is in the offing, but this business will not aid operations for at least several months. New barge work does not figure prominently at this time, nor is miscellaneous demand important. Official award of 48 pontoons for the United States Engineer Office, Memphis, involving 670 tons of fabricated plate, has been made to the Midland Barge Co.

Structural awards in the past week were largely restricted to projected work west of the Mississippi River. Highway bridges and lock and dam construction accounted for the bulk of these contracts, with a sprinkling of private work noticeable. Fresh structural projects are very limited, the only outstanding items covering lock construction on the Mississippi River.

Rails and Track Accessories

The Pennsylvania Railroad has allocated 42,000 tons of rails to the local producer against its recent large purchase. The remainder of the Pennsylvania tonnage has been distributed as follows: Bethlehem Steel Corpn., 44,000 tons; Illinois Steel Co., 8000 tons, and Inland Steel Co., 6000 tons. Local steel mills will also share in the Pennsylvania's orders for track fastenings. Mills in this district, however, will probably not be engaged on the Pennsylvania business until some time late in the first quarter. Figures on other requirements of rails and track fastenings are rapidly being assembled at Washington, and a large part of the entire tonnage covered in the railroad purchasing program is expected to be in the hands of producers in January. Final placement by the Pittsburgh & West Virginia Railroad of a small tonnage of rails and accessories hinges upon approval of a Government loan.

Wire Products

Releases against fourth quarter contracts are still appearing with frequency, and as a result wire mills are fairly well fortified with tonnage to maintain present operations for the remainder of December. The jobbing trade is particularly active in covering against the higher prices for first quarter. Demand for manufacturers' wire from the automotive industry is slightly improved. New contracting for first quarter has not yet appeared.

Tubular Products

Many railroads will take bids this month on first quarter requirements of boiler tubes. As these bids are usually stipulated on a "requirement" basis, the aggregate volume of such business cannot be measured accurately. The Pennsylvania Railroad will take bids next week on its requirement of tubes. General demand for lap-welded and commercial seamless boiler tubes has

not picked up, despite the impending lower discounts for first quarter. December bookings are barely keeping pace with November and October tonnage. With Dec. 15 the deadline for specifications against fourth quarter contracts, some additional tonnage may be driven in. Standard pipe is not particularly active. New line pipe projects are lacking, and oil country goods are relatively quiet.

Sheets

Although movement of sheets to the automobile makers still is lagging, demand from other consuming lines has spurted. As a result of unexpected December tonnage recently booked by a leading mill, operations for the sheet mill group are averaging slightly higher this week at 30 to 32 per cent of capacity. Small orders for galvanized sheets for railroad car repair work have recently been placed. With the exception of the price of tin mill black sheets, all current sheet quotations will be extended into first quarter.

Tin Plate

Production at certain leading producing units is being pushed to meet the delivery deadline on Dec. 31. Labor difficulties at one mill are impeding output, but operations for the tin plate group are being maintained at close to 85 per cent of capacity. Some bookings for next year have been reported, but the aggregate volume of forward business is not yet sufficient to provide a significant backlog for the early months of 1934.

Strip Steel

Spot business in hot-rolled strip from the motor car industry continues to improve. Miscellaneous demand is likewise spreading. The betterment may be considered significant in view of the fact that current buying is practically all against imperative needs, and is not induced by impending advances in quotations for next quarter. Current shipments are consequently believed to be going directly into consumption, and, following the inventory period late this month, a further increase in demand is in prospect for January. Current quotations of 1.75c. for hot-rolled, and 2.40c. for cold-rolled, Pittsburgh, are expected to remain unchanged throughout the first quarter.

Cold-Finished Steel Bars

Despite the advent of a $3 a ton advance in prices for first quarter, demand for cold-finished bars has not expanded appreciably. Incoming tonnage from the jobbing trade is undoubtedly increasing, as are bookings from the automotive industry, but aggregate volume thus far in December is not perceptibly greater than that placed in the fore part of November. With the possible exception of jobbers, buyers of cold-finished stock are naturally desirous of keeping inventories as low as possible. A great many consumers are already well stocked.

Coke and Coal

Demand for furnace and foundry coke is very spotty. Contract deliveries are suspended in many cases, with few consumers disposed to take in additional tonnage on the eve of inventories. The bituminous coal market is very quiet. Reappearance of labor difficulties at "captive" mine units has had no bearing on the market. Most large users are covered until April and are apparently not in a mood to supplement present coverage. Slack is accumulating rapidly at many operations, and producers are experiencing difficulty in disposing of this grade. Bituminous steam coal is also plentiful. Severe weather has stimulated a brisker demand for domestic-sized bituminous coal.

Scrap

Sales in the past week have established No. 1 heavy melting steel 50c. a ton higher at $11.75 to $12.25, delivered. No. 1 steel offered on the Pennsylvania Railroad's recent scrap list brought $12.60, delivered, or more than $2 a ton higher than the low bid against the previous list. A nearby mill is reported to have paid $12.50 last week for a round tonnage of No. 1 steel. Dealers who are short of that grade are offering $11.75 to $12. Machine shop turnings have been advanced 50c. a ton on a recent sale at $8.50. Interest in low phosphorus scrap is improved. In the Youngstown district, No. 1 steel is reported to have been sold this week at $12.

Usual December Lull in Valley Output May Be Avoided If Orders Hold Up

YOUNGSTOWN, Dec. 12.—Unmistakable evidences of improved demand for finished steel products practically assure Valley producers that the usual December recession in activity will be averted. A large share of current specifications and spot orders represents covering in anticipation of higher prices to become effective on Jan. 1. Substantial orders for track accessories, plates, sheets and bars will soon be officially placed with at least two large producers in this district by the Pennsylvania Railroad. Inasmuch as delivery of most of this tonnage will be made during the first half of next year, it is doubtful that the business will benefit rolling schedules during the remainder of December. Enough miscellaneous business is in prospect, however, to at least maintain the present ingot output of 33 to 35 per cent.

Some additional fourth quarter tonnage is expected from the automobile makers by the middle of December. Demand for sheet and strip steel is also gaining support from Government work. Export orders for sheets are frequent. Sheet mills are engaged at about 30 per cent of capacity. Hot-rolled strip mills are running at 20 to 25 per cent, while cold-rolled strip departments are occupied at only 15 to 18 per cent. If the expected pick-up in calls from the automotive industry is realized, sheet and strip mills will undoubtedly be able to step up production in the latter half of the month.

Tin plate mills are tapering output, though the recession is not so pronounced as expected. Bookings of tin plate for 1934 delivery have thus far been meager. New pipe tonnage is coming in rather slowly. Demand for oil country goods is fair. Public works projects are contributing to the movement of standard pipe. No sizable placements of line pipe have recently been reported. Steel fabricating units in this district continue to place their chief reliance for business on Federal and State work.

The primary materials markets, although quiet, are firm. A large mill recently completed quiet purchases of 15,000 to 20,000 tons of No. 1 heavy melting steel. Individual covering against this tonnage involved only small lots, with prices ranging from $10.50 to $11.50, delivered. In the open market, No. 1 heavy melting steel is generally quotable at around $11.50, although in some cases dealers' asking prices range up to $12. Current movement of pig iron is largely against precode contracts. Except in instances of credit limitations, practically all old pig iron orders will be fully committed by the year-end. With current quotations on basic, Bessemer and foundry pig iron to be extended through first quarter, forward contracting has not gained headway. Coal requirements of large consumers in this vicinity are reported to be amply covered ahead, and the rekindling of labor difficulties among the captive mines has not yet prompted any further important buying.

The Reynolds Metal Co., New York, has purchased the rights, materials and machinery for the manufacture of Ecod fabric from the E. D. Coddington Mfg. Co., Milwaukee, thus entering the building supplies field. The materials and machinery have been shipped to the Reynolds plant at Louisville, Ky., and Glendale, N. Y., where a new material to be known as Renholds Metallated Ecod will be made for the building industry.

Steel Production Up Two Points at Chicago

Rise in Rate to 26 Per Cent Follows Expansion in Contract Releases—First Quarter Outlook Promising

CHICAGO, Dec. 12.—The outlook in the iron and steel market is brighter, and buyers and sellers alike are more sanguine regarding the outlook for business early in the new year. Ingot output has risen two points to an average of 26 per cent of capacity. Forward contracting in finished steel is now gaining some headway and users of pig iron, convinced that prices are on the verge of going higher, are coming into the market in rapidly increasing numbers.

Expectations for an upturn early in 1934 are based on the belief that public expenditures will produce real tonnage by that time. The money being pumped back into farm areas will have a more telling effect, and the rail program, such as it will eventually be, will give mills additional work. Further loans are now being made for railroad equipment purchases, and the convening of Congress may result in the distribution of additional sums where they will aid industry.

There is some increase in private work, and late winter is expected to produce substantial automobile tonnages and possibly some additional steel requirements for agricultural implements.

The long range view is obscured by doubts regarding the extent to which private work will develop. The crucial question is whether or not the Government program can sustain activity long enough so that business will continue to gain by its own momentum.

Pig Iron

Most buyers have become convinced that prices for pig iron are destined to advance, and, as a result, forward contracting has reached large proportions and will grow still further if inquiries are indicative. The melt continues to drag, but December shipments will be fully equal to those of November. Southern iron is extremely dull. A few carloads of charcoal iron have been taken by consumers. The specialties, with the exception of silvery, are quiet.

Cast Iron Pipe

Miscellaneous business continues to show improvement, but real activity in this market still awaits more Government loans to various municipalities. Wilmette, Ill., has been granted a loan and will soon buy 900 tons of 24-in. pipe. Green Bay, Wis., will use concrete pipe instead of cast iron pipe. Some tonnage in the way of special castings and fittings will be placed early in the spring for the various locks that are being constructed along the upper Mississippi River.

Reinforcing Bars

Awards are extremely light, but inquiries for Government work, principally along the upper Mississippi River, promise some very attractive tonnages in the near future. Creeping into the market at a time when private projects are practically non-existent is a 100-ton inquiry for the Henrotin Hospital, Chicago. In general, dealers are expressing satisfaction over the new code, the effective date of which has been changed from Dec. 11 to Dec. 18. It provides for central estimating bureaus which will extend prices on all bids, thereby reducing to a minimum the possibility of errors which have frequently led to bitter controversies.

Rails and Track Supplies

Chicago rail mills are no longer operating, having about cleaned up all old orders and not yet having at hand specifications from any of the major railroads that have placed orders under the Government's buying plan. The prospect for additional purchases is mixed, though sellers expect business in the next few weeks from those railroads that will use their own funds. In the meantime mills are without the backlogs that permit balancing operations at this time of year. Of the Pennsylvania rail purchases 6000 tons went to the Inland Steel Co. and 8000 tons to the Illinois Steel Co.

Plates

The outstanding development in this market is the announcement from Washington that the Erie, the Nickel Plate, the Northern Pacific and the Chesapeake & Ohio have accepted public funds for the purchase of equipment. These loans will be used to finance about 13,000 freight cars, 167 passenger cars and 30 locomotives. Other similar loans are in prospect. Some miscellaneous tank work is reaching shops and contracts are steadily being placed for dam and lock work on the upper Mississippi River.

Sheet Steel Piling

This commodity is in active demand for the numerous dam projects along the Mississippi River. At Alton, Ill., 3900 tons will be used, about half of which will be for permanent work and the remaining tonnage for temporary coffer dams. Other tonnages are up for estimates at Winona, Minn., and Lynxville and Saverton, Wis. Prices are firm at 2.10c. a lb., Chicago.

Structural Material

Awards in the last seven days are noteworthy for the reason that they are widely spread over the country and they represent a greater diversity of uses. There are no outstanding lettings, the sizes of individual projects ranging from 100 to about 400 tons. Fresh inquiries are light except for those pending for construction work on the Mississippi River.

Wire Products

A few first quarter contracts have been placed and fresh inquiry points to a broadening of this line of activity. Specifications are steady and permit output at 25 to 30 per cent of capacity. Merchant business, including woven wire fencing, is particularly active as buyers crowd to take all possible tonnage against commitments that expire at the end of the year.

Cold-Rolled Strip

Forward contracting is beginning to make some headway. Current specifications for miscellaneous use are holding output in the range of 30 to 35 per cent of capacity. Automobile accessory manufacturers are near the point of entering the market.

Bars

Specifications are moderately heavier. Consumption of steel by farm implement manufacturers remains light and automobile plants are as yet taking rather small tonnages. Very little barn equipment is moving and manufacturers of steel furniture have about completed production runs for the Christmas trade.

Scrap

This market continues to gather strength and prices are gradually working up. On the basis of small sales to mills and what dealers are paying the railroads, heavy melting steel is quotable at $8.50 to $9. Railroad equipment manufacturers continue to buy and many of the grades they take are up $1 a ton. Their continuing interest in the market is evidenced by inquiries that point to active transactions over the remainder of the year. Bundles are changing hands among dealers at higher prices and brokers are speculating in cast iron wheels. The Santa Fe is holding large accumulations of steel grades and the Rock Island has withdrawn its list.

Steel Specifications Gain at New York

Code Contract Restrictions Drive in Tonnage—Competition for Fabricated Steel Is Severe—Rail Distribution Under Code in Doubt

NEW YORK, Dec. 12.—Under the steel code all shipments against expiring contracts must be made before Jan. 1. Any tonnage remaining unshipped at that time will be automatically cancelled. Many consumers apparently have not been aware of the existence of this provision and have been tardy in entering their specifications. Final appeals for action, however, are being made by the mills, and with some effect, since shipping orders are showing an appreciable upturn. Specifications have picked up particularly in wire products and other commodities which were recently advanced for first quarter.

Tin plate shipments are notably heavy, since buyers are accumulating as much tonnage as possible at 1933 prices. As a consequence there is virtually no contracting at first quarter prices. While not yet actively interested in forward commitments, tin plate consumers are urging that the contracting period be extended from three months to six months, pointing out that they have always covered for longer than quarterly periods in the past.

Code restrictions have also led to complications in connection with rail contracting. A railroad which had intended to divide its rail business between two mills has been instructed by the transportation coordinator to give the entire tonnage to the nearest producer. Since rails are quoted on an f.o.b. mill basis instead of a delivered basis, the more distant mill would probably be technically regarded as reducing its price if it absorbed the freight between its plant and the nearest mill. If this interpretation of the code is correct and is enforced, it will mean the allocation of all rail business on a strictly geographical basis.

Walsh Construction Co., Syracuse, N. Y., has been awarded the general contract for New York Central grade separation work in that city, involving 12,000 tons of structural steel. The fabrication contract has been placed with the American Bridge Co. The plain material for the towers of the Triboro bridge, New York, 13,000 tons, has been divided among two Pittsburgh mills and an eastern Pennsylvania producer. An increase in the number of small fabricating projects is particularly encouraging, since it indicates that public works activity may soon be supplemented by a revival of private construction.

Settlement of the local shipyards strike has as yet failed to result in an increased flow of plate tonnage for ship repair work. More active tank construction by Southern subsidiaries of leading oil companies has resulted from the transfer of refining operations from the North to the South.

Delay in the adoption of a steel fabricators' code has resulted in an accentuation of price competition. Although the amount of tonnage coming up for bids is increasing, there is no restraining influence to prevent competition from degenerating into a mad scramble for business in which all profit is sacrificed.

Pig Iron

Sales during the seven-day period aggregated 1700 tons, mostly for first quarter delivery, although a few prompt carlots were sold for special requirements. The previous week's bookings totaled 2300 tons, against 2500 tons a fortnight ago. Although buying is meager, shipments on old orders are in heavy volume. Major melters are increasing their yard stocks as much as their financial position permits.

Reinforcing Steel

Sellers are now operating under the code, and all prices are on a firm basis. This market is slightly more active as a result of weekly lettings of 200 to 300 tons by the Pennsylvania Highway Department. New York State opened bids on about 800 tons of mesh and bars for spring delivery, but no definite awards have been made. Concrete Steel Co. will supply 850 tons of bars for shipbuilding ways at Philadelphia, and 500 tons of mesh for Pennsylvania and New York roads was awarded to Kalman Steel Corpn. and Truscon Steel Co. Pending jobs include tonnages for road construction in all states of this district and about 500 tons required by a railroad bridge substructure at Buzzards Bay, Mass.

Scrap

The return of interest in outside consuming districts is reflected in a stronger tone in this market, but the stimulus is of insufficient magnitude to advance prices of leading grades. Despite the difficulty in securing boats, buying of No. 1 and No. 2 heavy melting steels for export continues in excellent volume at an unchanged price level of $7.50 and $6.50 a ton, barge. Yards are more inclined to restrict tonnages, and prices are consequently on a firmer basis. Bethlehem is loading heavy melting grades in moderate volume for ocean shipment to Sparrows Point, Md., but its market bids for cast grades are not attracting appreciable tonnages. Brokers are paying $9.50 to $10 at Harrisburg and Bethlehem, Pa., for heavy breakable cast, thereby advancing the New York quotation 25c. a ton to $6.25 to $6.50. No. 1 machinery cast continues to move to Phillipsburg, N. J., at $9 a ton, and a few carlots of blast furnace grades were loaded at quoted price levels. Rolling mill grades are generally ignored, and prices are untested.

Buffalo Steel Output Shows Gain

BUFFALO, Dec. 12.—Five open-hearths are active at Lackawanna, an increase of two. Republic Steel Corpn. dropped one unit, making three. Wickwire Spencer Corpn. added one, making two active. The Seneca sheet division of Bethlehem is operating at about 35 per cent of capacity.

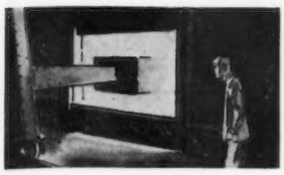
Walsh Construction Co. has the general contract for a grade crossing elimination for the New York Central at Syracuse, which will require 12,600 tons of fabricated structural and about 1000 tons of reinforcing bars. Bids will go in Dec. 13 for a group of buildings for the State hospital at Sonyea, N. Y., involving 500 to 600 tons, and on Dec. 21 for new buildings for the Albion State hospital, calling for 300 tons. A local company will fabricate 200 tons for a State highway bridge at Gardenville, N. Y.

Bethlehem's share of the Pennsylvania rail order—44,000 tons—will be rolled at its Steelton, Pa., plant.

Pig iron shipping instructions are continuing to come in on iron bought at pre-code prices. This material must be shipped before the first of the year. New business is light.

Scrap dealers expect more sustained open-hearth operations and, as a consequence, heavier buying in the near future. Scrap prices are inclined to be stronger. It is said that mills are buying from railroads and direct from manufacturing plants at prices higher than those quoted at the present time. Some small sales of short mixed borings and turnings and cast iron borings have been made at around $6.50. An inquiry is out for from 1000 to 2000 tons of stove plate.

Steel Ingot Rate in Sharp Rebound at Cleveland



Output Up Eight Points to 47 Per Cent —Releases Against Both Pig Iron and Steel Contracts Increase

CLEVELAND, Dec. 12.—Demand for finished steel showed a further moderate gain the past week. While the improvement was largely in steel bars, other products were somewhat more active. Some of the increase in orders for bars, plates and shapes is due to the desire of consumers to get their specifications in against fourth quarter contracts so that shipments may be made by Dec. 31, as required by the code. Contract customers will have to pay the higher present prices for steel shipped after that date. However, some of the bar orders are for current requirements and early deliveries are requested.

This improvement in demand for bars for early needs is largely from automobile parts manufacturers, who are getting busier with new orders released by the motor car builders. Some of the stamping plants in this territory have taken new orders for automotive work and this has resulted in increased activity in sheets. Additional sheet tonnage has also come directly from the automobile manufacturers.

Ingot output in the Cleveland-Lorain territory took an eight-point spurt this week to 47 per cent of capacity, two open-hearth furnaces being put on in Cleveland and two in Lorain. This compares with a recent low point of 26 per cent of capacity Nov. 1.

The Erie Railroad shortly will have an inquiry out for 30,000 tons of rails, or 6000 tons more than it purchased this year, and its track fastenings for which prices have been asked will amount to 12,000 to 15,000 tons. This business is expected to be placed in January. The Chesapeake & Ohio and Pere Marquette Railroads have issued inquiries for spikes, tonnages being unstated.

More interest is being shown in first quarter contracts, quite a few of which have been closed for bars and sheets by consumers who wish to protect themselves against any possible price advance during the quarter.

Bolt, nut and rivet manufacturers have reaffirmed prices for the first quarter with the exception of stove bolts which are advanced 10 per cent.

Pig Iron

New demand has improved. A Cleveland interest sold 4000 tons during the week in small lots and has pending inquiries for 2000 tons. Specifications against pre-code contracts show a marked improvement. Many foundries are ordering this iron because it was purchased at lower than present prices, and will not use it until after the first of the year. Producers will take orders against these contracts which they receive in time to make shipments before Jan. 1. Some of the foundries making automobile castings are getting busier and releasing more iron.

Sheets

The moderate improvement in the demand that developed recently is being maintained. New orders were placed by some of the automobile companies during the week, none for large tonnage. This business was for all sizes, indicating that some of the automobile manufacturers now have their dies ready for body production. Automobile makers have placed stamping orders for body parts with some shops in this territory, resulting in some new business from these plants. Refrigerator manufacturers have placed some additional tonnage. Enameling sheets are inactive, as consumers stocked up heavily before the recent price advance. Full-finished black plate is in good demand.

Strip

Some additional releases have come from motor car accessory plants, and there is an improvement in specifications from stamping plants in this territory that make automobile parts. New business is light.

Bolts, Nuts and Rivets

Makers have reaffirmed present prices on bolts, nuts and rivets for the first quarter. The only change is a 10 per cent advance on stove bolts. The reestablished prices are 70 per cent off list for bolts and nuts, $2.75 per 100 lb., Pittsburgh and Cleveland, and $2.85, Chicago and Birmingham, for large rivets, and 70 and 10 per cent off list for small rivets. New prices for stove bolts are 70, 25 and 10 per cent off list for packages and 83 per cent off list for bulk. Cotter pins have been advanced 10 per cent to 60, and 75½ per cent off list. Bolt and nut manufacturers decided that in view of a price advance made Oct. 15 they would mark prices up no further for the coming quarter although their raw materials will cost more.

Bars, Plates and Shapes

The general contract for the Easterly sewage disposal plant in Cleveland has been placed after delays incident to securing PWA funds. The steel required—3840 tons in reinforcing bars, plates and structural material—will be purchased shortly. Ohio fabricators have taken dump bodies, requiring 180 tons of plates, for a recent Government truck order. Some of the forge shops have placed first quarter contracts for bars and billets.

Iron Ore

Receipts of Lake Superior ore at Lake Erie docks for the season until Dec. 1, 1933, were 16,297,398 tons, as compared with 2,707,548 tons during the same period last year. Shipments from these ports for the season were 11,910,587 tons as against 2,478,190 tons last year. Dock balance Dec. 1 was 5,405,691 tons, and on the same date last year, 5,191,114 tons. Receipts at other than Lake Erie ports during 1933 were 5,068,955 tons, including 554,370 tons received at Detroit, 1,015,417 tons at Indiana Harbor, 1,369,505 tons at Gary, Ind., 2,005,788 tons at South Chicago, and 123,870 tons at Hamilton, Ont.

Scrap

Some consumer demand has developed and a firmer tone is indicated in purchases of a substantial tonnage of heavy melting steel scrap by a Youngstown consumer. This consumer paid $11.25 for one lot of No. 1 heavy melting steel and two or three days later made an additional purchase at $11.50. For No. 2 it paid $11. A Cleveland consumer bought several thousand tons of blast furnace scrap, paying $7.50, which is the price that has prevailed locally for some time. Owing to the absence of a local demand some local distress steel-making scrap has been going to Pittsburgh and Youngstown mills at somewhat under quoted prices.

Scrap Has Stronger Tone at Detroit

DETROIT, Dec. 12.—A revival of interest on the part of scrap consumers in other districts has led local dealers to pay 25c. a ton more for heavy melting steel and hydraulic bundles than they did a week ago. Scrap already contracted for by dealers is coming out of the automobile industry so slowly as to prove embarrassing in some cases in filling current obligations. The local steel plant has comfortable stocks of scrap and is indifferent toward further purchases at this time.

Iron and Steel Output Higher in South

BIRMINGHAM, Dec. 12.—Two more blast furnaces of the Tennessee Coal, Iron & Railroad Co. resumed production last week, raising the district's total to 10 active stacks. This is a gain of four within the past three weeks, all furnished by the Tennessee company. The two furnaces returning to the active list last week were Ensley No. 6, on recarburizing iron, and Fairfield No. 6, on basic.

This is the highest total of active furnaces this year, with the exception of a few days in August. Last week, seven of the 10 furnaces were on foundry iron, two on basic and one on recarburizing iron. The Tennessee company has two on foundry, but this week will change one, Ensley No. 5, to ferromanganese, and the other, Ensley No. 3, to basic iron.

The increase in furnace operations of the Tennessee company to five has been preparatory to the resumption of the Ensley rail mill. Operations of the merchant producers are unchanged. Sloss-Sheffield has two on foundry iron, Republic Steel two on foundry and Woodward Iron one on foundry.

Pig iron shipments are holding at a steady rate, in line with expectations. Old low-price contracts are being cleared up.

A few sales have been made for the first quarter at $13.50, the base price both for spot business and for the next quarter, but the market is not active on account of backlogs.

Pressure pipe inquiries are improving and December is expected to prove almost as good a month as November. Toward the end of last month a number of releases were received on tonnage that had been on the books as long as two and three months. Additional releases are looked for this month.

Steel

The Ensley rail mill of the Tennessee company will resume production on Wednesday for a run now scheduled to middle January, but which will probably extend beyond, as additional business is likely within the next three or four weeks. The last long schedule of the mill ended Aug. 10 and since that time it has worked only four days, which were in early October. Track accessories have been included in the railroad buying, resulting in production on a fair schedule.

Within the past ten days, as a result of the price advances for the first quarter, demand for wire products has shown a substantial gain and current business is now ahead of both October and November. Sheets have been carried along by this revival in buying as a result of mixed car orders. Heavier products are still quiet.

Last week there was a gain of one open-hearth, Gulf States increased from two units to three, while the Tennessee company continued with four, giving the district a total of seven, as compared with six during the preceding four weeks.

On Monday the Tennessee company fired five units at Ensley and the total this week will be 12, the highest since Sept. 2.

Pig Iron Carryover to Be Light at St. Louis

ST. LOUIS, Dec. 12.—While buyers of pig iron were eager to learn prices for the first quarter, their interest seems to have waned with the announcement that current prices had been reestablished, and there has been little buying so far. However, a marked increase in buying is expected after the turn of the year, in view of the small carryover by melters, said to be the smallest in years. It is expected that some contract tonnage will be canceled in the case of melters who have been unable to obtain the necessary financial support from bankers for their purchases. Shipments are being well maintained, however.

Quiet prevails in the market for finished steel products of all kinds, the only exception being the purchase of a round tonnage of sheets by a district stove company. Seasonal demand for galvanized sheets from the South is expected to develop considerably ahead of last year. The Missouri Pacific Railway has awarded 1050 tons of structural steel for a bridge at Snow Lake, Ark., to Stupp Brothers Bridge & Iron Co.

An East Side melter bought several thousand tons of heavy melting scrap during the week. Outside offerings of scrap are said to be very light, and the only local railroad list of the week was that of the Missouri Pacific, with 65 carloads. Miscellaneous standard-section rails are 25c. a ton higher and No. 1 machinery cast is 25c. a ton lower.

Federal Work Swells Trade On Coast

SAN FRANCISCO, Dec. 11.—Activity on the Pacific Coast has increased with the addition of private and State work to pending Federal projects. Bookings and new inquiries reported involve a larger structural steel tonnage than for any week in the last quarter, with totals of 7963 tons and 6671 tons respectively. Although only 613 tons of reinforcing bars was let during the week, 4307 tons will be required for new work added to the pending list. Inquiries for fabricated plate and cast iron pipe totaled 1250 and 2238 tons respectively.

The more optimistic tone to be noted in the trade is based largely on increased Federal work. The Government has let or will place contracts during the month which call for 4135 tons of reinforcing bars and 9373 tons of structural steel. In addition, it is expected that several municipalities will proceed shortly on authorized major construction projects. California fabricators are hopeful of having the difficulties that have resulted from the State sales tax corrected in the coming legislature.

Pig Iron Bookings Up at Cincinnati

CINCINNATI, Dec. 12.—Interest in first quarter pig iron requirements raised total bookings in this district to about 1400 tons last week. The code provision for contract cancellations of unfilled tonnages as of Jan. 1 has further strengthened the conviction that upward modification of prices is inevitable. Average foundry operations are unchanged, but castings requirements are shifting slightly. A small improvement in machine tool foundry operations has tended to take up some of the slack resulting from reduction in the stove melt. A central Indiana melter purchased 450 tons of Northern foundry iron and an Ohio consumer took 500 tons, all for first quarter shipment.

Coke

Specifications for by-product foundry coke are better than last month. No action has yet been taken on contracts for next year.

Steel

Improvement in automotive sheet demand has brought bookings to 40 per cent of mill capacity. Operations are on a parity with new business, although the leading interest reports that work in its units is being staggered. Price firmness is not conducive to sudden spurts in new business, but current orders reflect a steady flow of buying comparable with consumption.

Warehouse Business

Prices have been revised on boiler tubes, with specific quotations on quantity orders. Warehouse business in November was slightly better than in October, contrary to the usual seasonal trend.

Scrap

Bullishness of scrap dealers is contributing a firmer market tone, despite lack of appreciable business. Dealers' bids remain unchanged and interest still centers in unfilled commitments.

Steel Production Higher In Eastern Pennsylvania

Specifications Against Fourth Quarter Contracts for Plates and Shapes Increase—Little Railroad Business Goes to Nearby Mills

PHILADELPHIA, Dec. 12.—Improved releases of plates and shapes against expiring fourth quarter contracts and increased demand for miscellaneous steel products have necessitated a rather sharp rise in steel production in the eastern Pennsylvania district. The leading interest is better engaged, and with higher output at two or three smaller plants, the steel making rate is estimated at 22 per cent of capacity with further improvement in prospect. Mills are insisting upon the placing of specifications this week if shipments are to be completed by Dec. 31, and the prospect of cancellation of low-priced contracts which are not fully taken out is driving in considerable business.

Railroad buying has been light in the last week and eastern Pennsylvania producers did not share heavily in recent orders placed by the Pennsylvania. This road is expected to issue an inquiry for its first quarter miscellaneous requirements before the week is over and it is now believed that some of the steel required for its proposed freight car building program will be included. The Western Maryland has ordered 2000 tons of rails and a small tonnage of spikes, while the Seaboard Air Line has placed a few hundred tons of spikes. This carrier is inquiring for tie plates, track bolts and additional spikes. Steel awards by the Navy Department are still being held up and structural and reinforcing bar tonnage is light.

Pig Iron

New business is almost entirely lacking in this district, but specifications against old contracts are well sustained. Consumers are taking out all the iron included in their contracts in most instances, and for this reason sellers expect light buying in the first half of the first quarter.

Bars, Plates and Shapes

With specifications heavy on fourth quarter contracts and most of such tonnage expected to be placed for rolling this week, sellers are beginning to direct their attention to prospects for the first quarter. The Navy Department has placed four coast guard cutters, requiring about 2000 tons of steel with the Charleston, S. C., Navy Yards, but has taken no action on similar boats on which bids were taken recently. A subway connection between Philadelphia and Camden, N. J., by means of the existing bridge is to be undertaken immediately with PWA funds and at least 5000 tons of shapes will be needed. Bids for the first section of this job will probably be asked for this week. Action is also expected early in the new year on the Philadelphia Federal Court House which will require 5000 tons. The reinforcing bar market is quiet, although the Concrete Steel Co. has taken 900 tons for a shipway at the Philadelphia Navy Yard.

Sheets

The larger consumers of automobile body sheets in the district are increasing their requirements and miscellaneous demand is well sustained. Radio makers, with their busy season at an end, have withdrawn from the market. First quarter contracting is at a slow pace, although a few users have placed business on the assumption that prices are likely to be advanced early in the first quarter.

Imports

The following iron and steel imports were received here last week: 7900 tons of iron ore from Morocco; 1418 tons of pig iron from British India; 124 tons of steel tubes, 71 tons of steel bars and 21 tons of cold-drawn steel rods from Sweden; 34 tons of steel bands, 25 tons of steel bars and 14 tons of structural shapes from France, and 15 tons of steel bars and 15 tons of structural shapes from Belgium.

Scrap

No fresh consumer buying has been reported in the last week, but the market remains quotably strong. Considerable tonnage could probably be taken at the $10 level which prevailed on the last purchase, but dealers are unwilling to duplicate this figure. The foundry grades are also stronger, with continued buying of cast scrap by an important melter a growing factor. Improved steel mill operations in the district are bullishly regarded by all dealers, and as the export movement has prevented the accumulating of scrap, the market is highly sensitive to renewed demand.

Heavy Pig Iron Shipments Reported in Boston

BOSTON, Dec. 12.—Current buying of pig iron is on a limited scale, but the Mystic Iron Works and other furnaces serving New England foundries are making heavy shipments against old contracts. According to a new ruling all existing pig iron contracts will be canceled Jan. 1. Foundries with cash are therefore taking their contract iron, most of which was purchased at prices well below today's ruling price. The taking of such iron, in the minds of furnace representatives, sounds the death knell for first quarter buying, except, perhaps, in carlots.

Advances in prices for No. 1 heavy melting steel at Philadelphia and Pittsburgh have not been reflected here. As was the case last week, activity in scrap centers almost exclusively in the export market. One barge load of 1100 tons of No. 2 steel has left here for New York, where it will be reloaded on a steamer for a foreign port. Two additional barges of 1100 tons each are now loading. The American Steel & Wire Co., Worcester, Mass., still offers $6.75 a ton, delivered, for No. 1 heavy melting steel, with little if any success.

Sales of cast iron pipe under the PWA program in the past fortnight have been in excess of $300,000. Most of the pipe is wanted for immediate delivery, and foundries are short of certain sizes.

Structural Fabricating Code Modified

WASHINGTON, Dec. 12 (*By Telegram*).—National Recovery Administrator Hugh S. Johnson today announced he has approved modification of the President's Reemployment Agreement for the structural iron and steel fabricating industry, permitting it to substitute the labor provisions of its pending code for the provisions of the agreement. Under the substitute agreement plan employees will work a maximum of 36 hr. a week and not more than 8 hr. a day. Minimum wages range from 27c. an hour in certain southern districts to 40c. an hour in Northern and mid-western areas. The substitute agreement also includes the pending code provisions governing the adjustment of contracts where such adjustments can be mutually agreed on between the parties to meet increases in costs as a result of compliance with the President's Reemployment Agreement.

Consumer Demand for Tin and Lead Continues in Satisfactory Volume

Sales of Prime Western at 4.50c. Approximate 2200 Tons; Electrolytic Copper Quiet and Steady at 8c., Valley

NEW YORK, Dec. 12.—Last week the electrolytic copper market became uneasy as distress lots were reported available at 7.75c. No significant transactions were reported at that figure, however, and the market soon returned to its usual steady position of 8c. a lb., delivered Connecticut points. Current bookings are of the typical carlot variety, and consumers are avoiding forward commitments. Shipments are also in smaller volume as fabricators reduce stocks in preparation for the inventory period. The revised code is again being actively discussed, and the entire trade hopes for settlement of disputed points in the near future. The proposals of the committee of three call for a sales preference to custom smelters of 10,000 tons monthly, with an additional 5000 tons when mine producers have booked 20,000 tons. All sales above 37,000 tons will be made from present stocks, and mine outputs will continue to be limited to 22,000 tons. Only legitimate consumers will be permitted to buy metal, and a central clearing board will supervise all operations of buyers and sellers. The establishment of a minimum market price is again gaining favor, but its adoption is doubtful. Foreign dealers and consumers continue actively interested in metal, and American representatives have been disposing of good tonnages at prices which ranged from 7.75c. to 7.80c. a lb., c.i.f. Continental base ports, during the week.

Tin

Gaining strength from stronger dollar values, Straits tin in New York closed the seven-day period with over a 100-point net loss. Importers and dealers are fairly active, and moderate prompt and March tonnages of Straits and refined grades priced between 52c. and 53c. a lb., New York, have been booked. Sellers judge the recent buying as a genuine trade demand, since very little metal has gone to professional interests. London transactions continue in good volume at prices which advanced during the week to today's position of £228 for spot and £228 2s. 6d. for future standard, and £231 15s. for Eastern metal. A somewhat surprising feature is that values abroad have not responded to the low position of Liverpool stocks, although some negative pressure on prices comes from the International Pool's 5000-ton stock which may be liquidated at any time.

Lead

Demand is of sufficient magnitude to enable sellers to dispose of daily sales allotments equivalent to the tonnage of ore receipts. The widespread refusal of principal smelters to dip into reserve stocks is serving to maintain prices fairly firm at 4.05c. a lb., St. Louis, and 4.15c., New York. November bookings exceeded 32,000 tons, and December sales for prompt and January delivery are already above 30,000 tons. Cable makers continue to restrict purchases, but all other types of consumers are participating in current activity. The market for lead is unique in that consumer support is seemingly adequate to prevent drastic price weakness despite an unsatisfactory statistical position.

Zinc

The market for spelter continues quiet, with the major portion of trading confined to prompt and nearby deliveries. In some directions regular trade is securing moderate tonnages through April at the currently steady market price of 4.50c. a lb., East St. Louis, and 4.85c., New York. About 2200 tons of prime Western at 4.50c. was booked last week, compared with 3000 tons in the preceding period. There is apparently no reflection marketwise of the poor statistical trend of refined metal, and the present price position, although not firm, is holding steady despite scattered attempts to induce shading. Prime Western stocks rose 2500 tons in November, and shipments declined 11,200 tons to 27,000 tons. November sales for prompt delivery totaled 3514 tons at a weighted average selling price of 4.507c. a lb., East St. Louis, and forward bookings were 5645 tons at 4.518c. The Joplin ore market last week declined to $28.50 a ton for all grades of concentrates. Mills resumed normal production on Dec. 4, and output rapidly reached the usual weekly level of 7000 tons. Sales were higher at 5700 tons, shipments advanced to 4450 tons, and visible stocks at the end of the week were estimated at 12,800 tons.

The Week's Prices. Cents Per Pound for Early Delivery

	Dec. 6	Dec. 7	Dec. 8	Dec. 9	Dec. 11	Dec. 12
Electrolytic copper, N. Y.*	7.75	7.75	7.75	7.75	7.75	7.75
Lake copper, N. Y.	8.00	8.00	8.00	8.00	8.00	8.00
Straits tin, Spot, N. Y.	52.75	52.62½	53.25	....	53.12½	52.65
Zinc, East St. Louis	4.50	4.50	4.50	4.50	4.50	4.50
Zinc, New York	4.85	4.85	4.85	4.85	4.85	4.85
Lead, St. Louis	4.05	4.05	4.05	4.05	4.05	4.05
Lead, New York	4.15	4.15	4.15	4.15	4.15	4.15

*Refinery quotations; price ¼c. higher delivered in Connecticut.

Aluminum, 98-99 per cent, 22.90c. a lb., delivered; New No. 12, 18.50c. a lb., delivered.
Aluminum, remelt No. 12 (alloy), carload lots delivered, 12c. a lb., average for week.
Nickel electrolytic cathode, 35c. a lb., delivered; shot and ingot, 36c. a lb., delivered.
Antimony, 7.25c. a lb., New York.
Brass ingots, 85-5-5-5, 8.25c. a lb., New York and Philadelphia.

From New York Warehouse

Delivered Prices, Base per Lb.

Tin, Straits pig	55.00c. to 56.00c.
Tin, bar	57.00c. to 58.00c.
Copper, Lake	9.25c. to 10.00c.
Copper, electrolytic	9.00c. to 9.50c.
Copper, castings	8.75c. to 9.75c.
*Copper sheets, hot-rolled	14.50c.
*High brass sheets	13.75c.
*Seamless brass tubes	16.00c.
*Seamless copper tubes	16.00c.
*Brass rods	11.87½c.
Zinc, slabs	6.00c. to 7.00c.
Zinc sheets (No. 9), casks	9.75c. to 10.00c.
Lead, American pig	5.12½c. to 6.12½c.
Lead, bar	6.12½c. to 7.12½c.
Lead, sheets	8.00c.
Antimony, Asiatic	8.50c. to 9.50c.
Alum., virgin, 99 per cent plus	23.30c.
Alum., No. 1 for remelting, 98 to 99 per cent	18.00c. to 19.00c.
Solder, ½ and ½	31.00c. to 32.00c.
Babbitt metal, commercial grade	25.00c. to 60.00c.

*These prices are also for delivery from Chicago and Cleveland warehouses.

From Cleveland Warehouse

Delivered Prices per Lb.

Tin, Straits pig	56.25c.
Tin, bar	55.25c.
Copper, Lake	9.125c. to 9.25c.
Copper, electrolytic	9.125c. to 9.25c.
Copper, castings	8.15c.
Zinc, slab	5.75c. to 6.00c.
Lead, American pig	5.00c. to 5.25c.
Lead, bar	8.00c.
Antimony, Asiatic	9.00c.
Babbitt metal, medium grade	19.75c.
Babbitt metal, high grade	61.00c.
Solder, ½ and ½	32.50c.

Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators, and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	6.25c.	7.25c.
Copper, hvy. and wire	6.00c.	7.00c.
Copper, light and bottoms	5.00c.	5.75c.
Brass, heavy	3.50c.	4.00c.
Brass, light	3.00c.	3.50c.
Hvy machine composition	4.50c.	5.125c.
No. 1 yel. brass turnings	4.25c.	5.00c.
No. 1 red brass or compos. turnings	4.00c.	4.75c.
Lead, heavy	3.00c.	3.50c.
Zinc	2.50c.	3.00c.
Cast aluminum	7.25c.	8.50c.
Sheet aluminum	11.25c.	12.75c.

Reinforcing Steel

Awards 3000 Tons—New Projects 4100 Tons

AWARDS

Philadelphia, 900 tons, Navy Yard shipbuilding ways, to Concrete Steel Co.

Susquehanna, Berks, and Sullivan Counties, Pa., 350 tons, road mesh, to Kalman Steel Corpn.

Westchester County, N. Y., 100 tons, road mesh, to Truscon Steel Co.

Fort Benning, Ga., 800 tons, barracks, to Connors Steel Co.

Springfield, Ill., 300 tons, water plant, to Laclede Steel Co.

Panama Canal, 190 tons, material for Navy Yard, to an unnamed bidder.

Denver, 200 tons, Bureau of Reclamation Specification No. 23032-A and C, to unnamed bidders.

Los Angeles, 135 tons, Metropolitan Water District Specification No. 18112, to Soule Steel Co.

NEW REINFORCING BAR PROJECTS

Jamaica Plain, Mass., 120 tons, monastery.

Syracuse, N. Y., 1000 tons, New York Central grade crossing elimination; Walsh Construction Co., general contractor.

Hunterdon County, N. J., 200 tons, road mesh and bars; general contract to Riverside Cement Co.

Hickman, Ky., 325 tons, river wall.

Winona, Minn., 360 tons, Dam 5-A across Mississippi River.

Lynxville, Wis., 400 tons, Dam No. 9 across Mississippi River.

Joliet, Ill., 170 tons, Ruby Street bridge.

Hannibal, Mo., 200 tons, Dam across Mississippi River.

Burlington, Iowa, 200 tons, Dam across Mississippi River.

Chicago, 100 tons, Henrotin Hospital.

Saverton, Mo., 600 tons, lock and dam across Mississippi River; bids to be opened Dec. 18 by United States Engineer, St. Louis.

State of Montana, 145 tons, highway work in four counties; bids Dec. 15.

Mare Island, Cal., 680 tons additional, causeway at Navy Yard; bids under advisement.

Boulder Dam, 920 tons, Soule Steel Co., low bidder.

Hamilton Field, Cal., 100 tons, headquarters building; bids under advisement.

State of California, 130 tons, highway work in Los Angeles and Mendocino counties; bids Dec. 27.

Marsh Field, Cal., 100 tons, medical detachment barracks; bids under advisement.

Seattle, 1755 tons, Railroad Avenue seawall; bids Dec. 21.

Pearl Harbor, T. H., 250 tons, storehouse extension; bids under advisement.

Pipe Lines

Panhandle Eastern Pipe Line Co., Fairfax Building, Kansas City, Mo., plans steel pipe line from Moberly, Mo. to Macon, Mo., for gas service at latter place. Company recently acquired Macon Gas & Electric Co.

General Purchasing Officer, Panama Canal, Washington, asks bids until Dec. 19 for 20,000 ft. steel or wrought iron pipe (Schedule 2924).

Fallbrook Public Utility District, Fallbrook, Cal., plans installation of about 7000 ft. 8-in. steel pipe for water main trunk line. John H. Chase, Security Title Building, Riverside, Cal., engineer.

Tacoma, Wash., plans pipe line, about 66,000 ft., 42- to 63-in. steel or reinforced-concrete pipe for water service, replacing present wood stave pipe line. Fund of $150,000 available for this and other water system work. W. A. Kunigh is city engineer.

Ouray, Colo., will install about 10,000 ft. galvanized steel pipe for water system, replacing present line. Federal loan has been secured.

Las Cruces, N. M., plans steel pipe line for natural gas main trunk supply and distributing service, making connection with line near Anthony, N. M. Cost about $200,000. Financing is being arranged by Federal grant and loan.

Railroad Equipment

Hawaiian Dredging Co., general contractor, will place 700 tons of 80-lb. rails for pier and quay walls at Pearl Harbor, T. H.

Seattle has taken bids on 400 car wheels.

Chesapeake & Ohio, Erie, Nickel Plate and Northern Pacific have had loans totaling $36,307,500 approved by Public Works Administration for the purchase of 12,775 freight cars, 167 passenger cars and 30 locomotives.

New York, New Haven & Hartford has received approval from Public Works Administration for a loan of $3,500,000 for repairing and rebuilding cars and other equipment.

Lehigh Valley has obtained approval from Public Works Administration for a loan of $2,000,000 for repairing and rebuilding cars and other equipment.

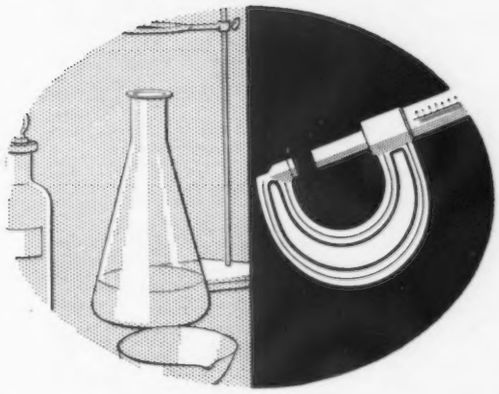
RAILS

Erie will soon inquire for 30,000 tons of rails and is now in the market for 12,000 to 15,000 tons of track fastenings.

Western Maryland has bought 2000 tons of rails.

Pennsylvania has ordered 100,000 tons of 112, 131 and 152-lb. standard-section rails and 350 tons of girder rails, as follows: 42,000 tons to Carnegie Steel Co.; 8000 tons to Illinois Steel Co.; 6000 tons to Inland Steel Co.; 44,000 tons, and 350 tons of girder rails to Bethlehem Steel Co.

WYCKOFF



FOR PRECISION

No matter how close the tolerance—or how exacting the chemical and physical specifications—you can always depend on the micrometric accuracy of Wyckoff Steels to meet your requirements most satisfactorily and economically.

That's why it always pays to specify Wyckoff.

WYCKOFF DRAWN STEEL COMPANY

GENERAL OFFICES: Ambridge, Pa.
MILLS at Ambridge, Pa. and Chicago, Ill.

Manufacturers of
COLD DRAWN STEELS
Turned and Polished Shafting Turned and Ground Shafting

Prices of Finished and Semi-Finished Steel, Coke, Coal, Cast Iron Pipe

BARS, PLATES, SHAPES

Iron and Steel Bars

Soft Steel	*Base per Lb.*
F.o.b. Pittsburgh mill	1.75c.
F.o.b. Chicago or Gary	1.80c.
Del'd Philadelphia	2.04c.
Del'd New York	2.08c.
F.o.b. Cleveland	1.80c.
F.o.b. Buffalo	1.85c.
F.o.b. Birmingham	1.90c.
F.o.b. cars dock Pacific ports	2.30c.
F.o.b. cars dock Gulf ports	2.15c.
Rail Steel (For merchant trade)	
F.o.b. Cleveland	1.70c.
F.o.b. Chicago	1.70c.
F.o.b. Gary	1.70c.
F.o.b. Pittsburgh	1.65c.
F.o.b. Buffalo	1.75c.
F.o.b. Birmingham	1.80c.
Billet Steel Reinforcing (Stock lengths as quoted by distributers; cutting to length, 60 in. and over takes extra of 10c. per 100 lb.)	
F.o.b. P'gh mills	1.80c.
F.o.b. Birmingham	1.85c.
F.o.b. Buffalo	1.85c.
F.o.b. Cleveland	1.85c.
F.o.b. Youngstown	1.85c.
F.o.b. cars dock Pacific ports	2.35c.
F.o.b. cars dock Gulf ports	2.20c.
(Cut lengths as quoted by distributers)	
F.o.b. Chicago	1.95c.
Rail Steel Reinforcing (Cut lengths as quoted by distributers)	
F.o.b. Pittsburgh	1.75c.
F.o.b. Cleveland	1.80c.
F.o.b. Chicago	1.80c.
Iron	
Common iron, f.o.b. Terre Haute, Ind.	1.60c. to 1.75c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	1.89c.
Common iron del'd New York	1.93c.

Steel Car Axles

F.o.b. Pittsburgh	2.50c.
F.o.b. Chicago	2.50c.

Tank Plates

	Base per Lb.
F.o.b. Pittsburgh mill	1.70c.
F.o.b. Chicago	1.75c.
F.o.b. Gary	1.75c.
F.o.b. Birmingham	1.85c.
Del'd Cleveland	1.885c.
Del'd Philadelphia	1.885c.
F.o.b. Coatesville	1.80c.
F.o.b. Sparrows Point	1.80c.
Del'd New York	1.98c.
F.o.b. dock cars Pacific ports	2.25c.
F.o.b. cars dock, Gulf ports	2.10c.
Wrought iron plates, f.o.b. P'gh	3.00c.

Floor Plates

F.o.b. Pittsburgh	3.20c.
F.o.b. Chicago	3.25c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh mill	1.70c.
F.o.b. Chicago	1.75c.
F.o.b. Birmingham	1.85c.
F.o.b. Buffalo	1.80c.
F.o.b. Bethlehem	1.80c.
Del'd Cleveland	1.885c.
Del'd Philadelphia	1.905c.
Del'd New York	1.8525c.
F.o.b. cars dock, Gulf ports	2.10c.
F.o.b. dock cars Pacific ports (standard)	2.25c.
F.o.b. dock cars Pacific ports (wide flange)	2.35c.

Steel Sheet Piling

	Base per Lb.
F.o.b. Pittsburgh	2.00c.
F.o.b. Chicago mill	2.10c.
F.o.b. Buffalo	2.10c.
F.o.b. cars dock Gulf ports	2.45c.
F.o.b. cars dock Pacific ports	2.45c.

Alloy Steel Bars

F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton. Open-hearth grade, base...2.45c. a lb. except at Bethlehem where the price is 2.55c.

S.A.E. Series Numbers	Alloy Differential per 100 lb.
2000 (1½% Nickel)	$0.25
2100 (2½% Nickel)	0.55
2300 (3½% Nickel)	1.50
2500 (5% Nickel)	2.25
3100 Nickel Chromium	0.55
3200 Nickel Chromium	1.35
3300 Nickel Chromium	3.80
3400 Nickel Chromium	3.20
4100 Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600 Nickel Molybdenum (0.20 to 0.30 Molybdenum) (1.50 to 2.00 Nickel)	1.05
5100 Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100 Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100 Chromium Spring Steel	base
6100 Chromium Vanadium Bar	1.20
4100 Chromium Vanadium Spring Steel	0.95
Chromium Nickel Vanadium	1.50
Carbon Vanadium	0.95

Above prices are for hot-rolled steel bars. The differential for most grades in electric furnace steel is 50c. higher. The differential for cold-drawn bars is ½c. per lb. higher with separate extras. Blooms, billets and slabs under 4x4 in. or equivalent are sold on the bar base. Slabs with a section area of 16 in. and 2½ in. thick or over take the billet base. Sections 4x4 in. to 10x10 in. or equivalent carry a gross ton price, which is the net price for bars for the same analysis. Larger sizes carry extras.

Cold Finished Bars*

	Base per Lb.
Bars, f.o.b. Pittsburgh mill	2.10c.
Bars, f.o.b. Chicago	2.15c.
Bars, Cleveland	2.15c.
Bars, Buffalo	2.20c.
Bars, Detroit	2.30c.
Bars, eastern Michigan	2.35c.
Precision round bars, Pittsburgh	2.30c.
Precision round bars, Cleveland	2.35c.
Precision round bars (alloy), Pitts.	3.00c.
Shafting, ground, f.o.b. mill, 1⅛ in.	3.40c.
1-3/16 to 1½ in.	2.90c.
1-9/16 to 1⅞ in.	2.75c.
1-15/16 to 2⅞ in.	2.60c.
2-15/16 to 6 in.	2.45c.

* In quantities of 10,000 to 19,000 lb.

SHEETS, STRIP, TIN PLATE TERNE PLATE

Sheets

Hot Rolled	*Base per Lb.*
No. 10, f.o.b. Pittsburgh	1.75c.
No. 10, f.o.b. Gary	1.85c.
No. 10, del'd Phila.	2.04c.
No. 10, f.o.b. Birmingham	1.90c.
No. 10, f.o.b. dock cars Pacific ports	2.42½c.
Hot-Rolled Annealed	
No. 24, f.o.b. Pittsburgh	2.25c.
No. 24, f.o.b. Gary	2.35c.
No. 24, del'd Phila.	2.54c.
No. 24, f.o.b. Birmingham	2.40c.
No. 24, f.o.b. dock cars Pacific ports	2.95c.
No. 24, wrought iron, Pittsburgh	4.30c.
Heavy Cold-Rolled	
No. 10 gage, f.o.b. Pittsburgh	2.30c.
No. 10 gage, f.o.b. Gary	2.40c.
No. 10 gage, del'd Phila.	2.59c.
No. 10 gage, f.o.b. dock cars Pacific ports	3.00c.
Light Cold-Rolled	
No. 20 gage, f.o.b. Pittsburgh	2.75c.
No. 20 gage, f.o.b. Gary	2.85c.
No. 20 gage, del'd Phila.	3.04c.
No. 20 gage, f.o.b. dock cars Pacific ports	3.45c.
Galvanized Sheets	
No. 24, f.o.b. Pittsburgh	2.85c.
No. 24, f.o.b. Gary	2.95c.
No. 24, del'd Phila.	3.14c.
No. 24, f.o.b. Birmingham	3.00c.
No. 24, f.o.b. dock cars Pacific ports	3.55c.
No. 24 Wrought iron, Pittsburgh	4.95c.
Long Ternes	
No. 24, unassorted 8-lb. coating f.o.b. Pittsburgh	3.25c.
Vitreous Enameling Stock	
No. 20, f.o.b. Pittsburgh	2.90c.
Tin Mill Black Plate	
No. 28, f.o.b. Pittsburgh	2.65c.
No. 28, Gary	2.75c.

Tin Plate

	Base per Box
Standard cokes, f.o.b. P'gh district mill	$5.25
Standard cokes, f.o.b. Gary	5.35
Standard cokes, f.o.b. cars dock Pacific ports	5.90

Terne Plate

(F.o.b. Pittsburgh)
(Per Package, 20 x 28 in.)

8-lb. coating I.C.	$10.00
15-lb. coating I.C.	12.00
20-lb. coating I.C.	13.00
25-lb. coating I.C.	14.00
30-lb. coating I.C.	15.25
40-lb. coating I.C.	17.50

Hot-Rolled Hoops, Bands, Strips and Flats under ¼ In.

	Base per Lb.
All widths up to 24 in., P'gh	1.75c.
All widths up to 24 in., Chicago	1.85c.
Cooperage stock, Pittsburgh	1.85c.
Cooperage stock, Chicago	1.95c.

Cold-Rolled Strips

F.o.b. Pittsburgh	2.40c.
F.o.b. Cleveland	2.40c.
Del'd Chicago	2.68c.
F.o.b. Worcester	2.60c.
Fender Stock	
No. 20, Pittsburgh or Cleveland	3.10c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh and Cleveland.)

To Manufacturing Trade	*Per Lb.*
Bright wire	2.20c.
Spring wire	3.20c.

To Jobbing Trade

Extras of 10c. a 100 lb. on joint carloads and 30c. on pooled cars and less-than-carload lots are applied on all merchant wire products. An allowance of $2 a ton is made to jobbers on straight, mixed or joint carloads; $3 a ton is allowed on less-than-carload shipments.

	Base per Keg
Standard wire nails	$2.35
Smooth coated nails	2.35
Galvanized nails	3.85
	Base per 100 Lb.
Smooth annealed wire	$2.35
Smooth galvanized wire	2.80
Polished staples	3.05
Galvanized staples	3.30
Barbed wire, galvanized	2.85
Woven wire fence, base column	60.00

Chicago and Anderson, Ind., mill prices are $1 a ton over Pittsburgh base (on all products except woven wire fence, for which the Chicago price is $2 above Pittsburgh); Duluth, Minn., and Worcester, Mass., mill prices are $2 a ton over Pittsburgh (except for woven wire fence at Duluth which is $3 over Pittsburgh), and Birmingham mill prices are $3 a ton over Pittsburgh.

STEEL AND WROUGHT PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel Inches	Black	Galv.	*Wrought Iron* Inches	Black	Galv.
⅛	51½	29½	⅛	+91½	+138
¼ to ⅜	57	38½	¼ & ⅜	+1½	+21½
½	62	50½	½	31½	15
¾	65½	55½	¾	36½	20½
1 to 3	67½	58½	1 & 1¼	39½	25½
			1½	43½	28
			2	41½	26

Lap Weld

2	63½	54½	2	37	22½
2½ to 3	66½	57½	2½ to 3½	38	25
3½ to 6	68½	59½	4 to 8	40	28½
7 and 8	67½	57½	9 to 12	38	24½
9 and 10	67	57			
11 and 12	66	56			

Butt Weld, extra strong, plain ends

⅛	48½	33¼	⅛	+13	+45½
¼ to ⅜	54½	41½	¼ & ⅜	+2¼	+34½
½	60	51	½	32½	17½
¾	61¼	55½	¾	37½	22½
1 to 3	66½	58½	1 to 2	43½	29

Lap Weld, extra strong, plain ends

2	61½	53½	2	40	26
2½ to 3	65½	57½	2½ to 4	45½	33
3½ to 6	69	61	4½ to 6	45	32½
7 and 8	68	58	7 & 8	46	33
9 and 10	67	57	9 to 12	41½	30
11 and 12	66	56			

Discounts on steel and wrought iron pipe are net and not subject to any points or preferentials.

Note—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Steel		*Charcoal Iron*	
2 in. and 2¼ in.	33	1½ in.—1¾ in.	44
2½ in.—2¾ in.	40	2 in.—2½ in.	13
3 in.	44	2½ in.—2¾ in.	16
3¼ in.—3½ in.	47	3 in.	17
4 in.	49	3¼ in. to 3½ in.	18
4½ in. to 6 in.	42	4 in.	20
		4½ in.	21

On lots of a carload or more, the above base discounts are subject to a preferential of two fives on steel and of 10 per cent on charcoal iron tubes. Smaller quantities are subject to the following modifications from the base discounts:

Lap welded steel—Under 10,000 lb., 6 points under base and one five; 10,000 lb. to carload 4 points under base and two fives. Charcoal iron—Under 10,000 lb., 2 points under base; 10,000 lb. to carload, base and one five. Exception: On 1½ to 1¾-in. charcoal iron tubes no supplementary discounts are granted, and the discount for 10,000 lb. to a carload is 4 points under base and for less than 10,000 lb. 8 points under base.

Standard Commercial Seamless Boiler Tubes
Cold-Drawn

1 in.	68	3 in.	38
1¼ to 1½ in.	68	3¼ to 3½ in.	41
1¾ in.	68	4 in.	43
2 to 2¼ in.	27	4½, 5 and 6 in.	36
2½ to 2¾ in.	34		

Hot-Rolled

2 and 2¼ in.	33	3¼ to 3½ in.	47
2½ and 2¾ in.	40	4 in.	49
3 in.	44	4½, 5 and 6 in.	42

In the case of all sizes except 1-in. to 1¾-in. cold-drawn boiler tubes supplementary discounts of two 5 per cents are allowed on carload lots. On quantities up to 10,000 lb. the base discount is reduced 10 points and a supplementary discount of 5 per cent only is allowed. On quantities 10,000 lb. to 24,999 lb. the base discount is reduced 6 points and a supplementary discount of 5 per cent only is allowed. On 25,000 lb. to a carload the base discount is reduced 2 points and supplementary discounts of two 5 per cents are allowed.

On 1 to 1¾-in. cold-drawn boiler tubes, there are no supplementary discounts. On quantities up to 10,000 lb. the base discount is reduced 12 points; on 10,000 lb. to 24,999 lb., it is reduced 8 points; on 25,000 lb. to a carload it is reduced 2 points.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30% base (carloads)	5
Carbon, 0.30% to 40% base	5

Plus differential for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

RAILS AND TRACK SUPPLIES

F.o.b. Mill

Standard rails, 60-lb. and heavier, per gross ton	$36.37½
Angle bars, per 100 lb.	2.55

F.o.b. Code Basing Points

Light rails (from billets) per gross ton	$32.00
Light rails (from rail steel) per gross ton	31.00

Base per 100 Lb.	
Spikes, 9/16 in. and larger	$2.60
Spikes, ½ in. and smaller	2.60
Spikes, boat and barge	2.60
Tie plates, steel	1.90
Track bolts, to steam railroads	3.50
Track bolts, to jobbers, all sizes (per 100 count)	70 per cent off list

BOLTS, NUTS, RIVETS AND SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
Machine bolts	70
Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagons	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Semi-finished hexagon nuts	70
Semi-finished hexagon castellated nuts, S.A.E.	70
Stove bolts in packages, P'gh.	70, 25 and 10
Stove bolts in packages, Ch'go.	70, 25 and 10
Stove bolts in packages, Cleveland	70, 25 and 10
Stove bolts in bulk, P'gh.	80
Stove bolts in bulk, Chicago	80
Stove bolts in bulk, Cleveland	80
Tire bolts	60

Large Rivets

(½-in. and larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$2.75
F.o.b. Chicago and Birmingham	2.85

Small Rivets

(7/16-in. and smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago and Birm'g'm	70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 65c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screw, 1 in. dia. and smaller	75, 10 and 10
Milled standard set screws, case hardened, 1 in. dia. and smaller	75 and 10
Milled headless set screws, cut thread ¾ in. and smaller	75
Upset hex. head cap screw, U.S.S.S. or S.A.E. thread, 1 in. dia. and smaller	65
Upset set screws cut and oval point	75 and 10
Milled studs	65 and 5

STAINLESS STEEL

(Max. 16% Cr, 6% Ni, 0.15% C)
(Base Prices, f.o.b. Pittsburgh)

	Per Lb.
Bars	20½c.
Plates	34c.
No. 20 gage cold-rolled sheets	30c.
Hot-rolled strip	19½c.
Cold-rolled strip, 0.100 or over	25c.

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

F.o.b. Pittsburgh, Youngstown, Chicago, Gary, Buffalo, Cleveland, Birmingham.

	Per Gross Ton
Rerolling	$26.00
Forging quality	31.00

Sheet Bars

F.o.b. Pittsburgh, Youngstown, Cleveland, Chicago, Buffalo, Canton, Sparrows Point.

	Per Gross Ton
Open-hearth or Bessemer	$26.00

Skelp

F.o.b. Pittsburgh, Youngstown, Chicago, Buffalo, Coatesville, Pa., or Sparrows Point, Md.

	Per Lb.
Grooved	1.60c.
Universal	1.60c.
Sheared	1.60c.

Pig Iron, Ores, Ferroalloys

Wire Rods

(Common soft, base)

	Per Gross Ton
Pittsburgh	$36.00
Cleveland	36.00
Chicago	37.00
Birmingham	39.00
Youngstown (del'd)	37.00

ALLOY STEEL BLOOMS, BILLETS AND SLABS

F.o.b Pittsburgh, Chicago, Buffalo, Massillon, Canton or Bethlehem.
Base price, $49 a gross ton except at Bethlehem, where it is $51.

CARBON STEEL FORGING INGOTS

F.o.b. Pittsburgh, Youngstown or Chicago.
Uncropped, $28 per gross ton.

COKE, COAL AND FUEL OIL

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville Prompt	$3.75
Foundry, f.o.b. Connellsville Prompt	$4.25 to 5.25
Foundry, by-product, Chicago ovens, for delivery outside switching district	8.50
Foundry, by-product, delivered in Chicago switching district	9.25
Foundry, by-product, New England, delivered	10.50
Foundry, by-product, Newark or Jersey City, del'd	8.20 to 8.81
Foundry, by-product, Phila.	8.50
Foundry, by-product, Cleveland delivered	9.27
Foundry, Birmingham	4.75
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry, by-product, del'd St. Louis	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.55 to $1.80
Mine run coking coal f.o.b. W. Pa.	1.80 to 2.00
Gas coal, ¾-in., f.o.b. Pa. mines	2.00 to 2.30
Mine run gas coal, f.o.b. Pa. mines	1.80 to 2.20
Steam slack, f.o.b. W. Pa. mines	1.30 to 1.40
Gas slack, f.o.b. W. Pa. mines	1.65 to 1.85

Fuel Oil

Per Gal. f.o.b. Bayonne, N. J.	
No. 3 distillate	4.00c.
No. 4 industrial	3.50c.
Per Gal f.o.b. Baltimore	
No. 3 distillate	4.00c.
No. 4 industrial	3.50c.
Per Gal. del'd Chicago	
No. 3 industrial fuel oil	3.73c.
No. 5 industrial fuel oil	3.23c.
Per Gal. f.o.b. Cleveland	
No. 3 distillate	5.75c.
No. 4 industrial	5.50c.

REFRACTORIES

Fire Clay Brick

	Per 1000 f.o.b. Works	
	High-heat Duty Brick	Intermediate Duty Brick
Pennsylvania	$45.00	$40.00
Maryland	45.00	40.00
New Jersey	55.00	43.00
Ohio	45.00	40.00
Kentucky	45.00	40.00
Missouri	45.00	40.00
Illinois	45.00	40.00
Ground fire clay, per ton	7.00	

Chrome Brick

	Per Net Ton
Standard size	$45.00

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$45.00
Chicago	54.00
Birmingham	55.00
Silica clay, per ton	8.00

Magnesite Brick

	Per Net Ton
Standard sizes, burned, f.o.b. Baltimore and Chester, Pa.	$65.00
Unburned, f.o.b. Baltimore	52.00
Grain magnesite, f.o.b Baltimore and Chester, Pa.	40.00
Domestic, f.o.b. Chewelah, Wash.	22.00

CAST IRON PIPE

	Per Net Ton
6-in. and larger, del'd Chicago	$44.00 to $45.00
4-in., del'd Chicago	47.00 to 48.00
6-in. and larger, del'd New York	43.00
4-in., del'd New York	46.00
6-in., and larger, Birmingham,	36.00 to 37.00
4-in. Birmingham	39.00 to 40.00

Class "A" and gas pipe, $3 extra.

PIG IRON

PRICES PER GROSS TON AT BASING POINTS

Basing Points	No. 2 Fdry.	Malleable	Basis	Bessemer
Everett, Mass.	$18.50	$19.00	$18.00	$19.50
Bethlehem, Pa.	18.50	19.00	18.00	19.50
Birdsboro, Pa.	18.50	19.00	18.00	19.50
Swedeland, Pa.	18.50	19.00	18.00	19.50
Sparrows Point, Md.	18.50	....	18.00	....
Neville Island, Pa.	18.00	18.00	17.50	18.50
Sharpsville, Pa.	17.50	17.50	17.00	18.00
Youngstown	17.50	17.50	17.00	18.00
Buffalo	17.50	18.00	16.50	18.50
Erie, Pa.	17.50	18.00	17.00	18.50
Cleveland	17.50	17.50	17.00	18.00
Toledo, Ohio	17.50	17.50	17.00	18.00
Detroit	17.50	17.50	17.00	18.00
Hamilton, Ohio	17.50	17.50	17.00	18.00
Chicago	17.50	17.50	17.00	18.00
Granite City, Ill.	17.50	18.00	17.00	....
Duluth, Minn.	18.00	18.00	....	18.50
Birmingham	13.50	....	12.50	....
Provo, Utah	16.50	....	....	....

DELIVERED PRICES PER GROSS TON AT CONSUMING CENTERS

	No. 2 Fdry.	Malleable	Basic	Bessemer
Boston Switching District				
From Everett, Mass.	$19.00	$19.50	$18.50	$20.00
From Buffalo	19.00	19.50	18.50	20.00
Brooklyn				
From East. Pa. or Buffalo	20.77	21.27	20.27	21.77
Newark or Jersey City, N. J.				
From East. Pa. or Buffalo	19.89	20.39	19.39	20.89
Philadelphia				
From Eastern Pa.	19.26	19.76	18.76	20.26
Cincinnati				
From Hamilton, Ohio	18.51	18.51	18.01	19.01
Canton, Ohio				
From Cleveland and Youngstown	18.76	18.76	....	....
Columbus, Ohio				
From Hamilton, Ohio	19.50	19.50	....	....
Mansfield, Ohio				
From Cleveland and Toledo	19.26	19.26	....	....
Indianapolis				
From Hamilton, Ohio	19.77	19.77	....	....
South Bend, Ind.				
From Chicago	19.55	19.55	....	....
Milwaukee				
From Chicago	18.50	18.50	....	....
St. Paul				
From Duluth	19.44	....	....	....
Davenport, Iowa				
From Chicago	19.26	19.26	....	....
Kansas City				
From Granite City	20.04	20.54	....	....

Delivered prices on Southern iron for shipment to Northern points are 38c. a gross ton below delivered prices from the nearest Northern basing points.

LOW PHOSPHORUS PIG IRON

Basing points: Birdsboro, Pa., Steelton, Pa. and Standish, N. Y.	$23.00
Johnson City, Tenn.	23.00
Del'd Chicago	28.65

GRAY FORGE PIG IRON

Valley furnace	$17.50

CHARCOAL PIG IRON

Lake Superior furnace	$20.50
Delivered Chicago	23.54
Delivered Buffalo	23.78

CANADA
Pig Iron

Per gross ton:

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75	$21.00
No. 2 fdy., sil. 1.75 to 2.75	20.50
Malleable	21.00
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75	$22.50
No. 2 fdy., sil 1.75 to 2.25	22.00
Malleable	22.50
Basic	22.00

Ferromanganese

	Per Gross Ton
Domestic, 80%, seaboard, (carload)	$82.00
Domestic, 80%, seaboard, (less carloads)	89.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$27.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50% (carloads)	$74.50
50% (less carloads)	82.00
75% (carloads)	120.00
75% (less carloads)	130.00
14% to 16% (f.o.b.) Welland, Ont. (in carloads) (duty paid)	31.00
14% to 16% (less carloads)	38.50

Silvery Iron

F.o.b. Jackson, Ohio, Furnace

Per Gross Ton		Per Gross Ton	
6%	$22.25	12%	$29.25
7%	23.25	13%	30.75
8%	24.25	14%	32.25
9%	25.25	15%	33.75
10%	26.25	16%	35.25
11%	27.75	17%	36.75

Bessemer Ferrosilicon

F.o.b. Jackson, Ohio, Furnace

Per Gross Ton		Per Gross Ton	
10%	$27.25	14%	$33.25
11%	28.75	15%	34.75
12%	30.25	16%	36.25
13%	31.75	17%	37.75

Manganese 1½ to 3%, $1 a ton additional. For each unit of manganese over 3%, $1 a ton additional. Phosphorus 0.75% or over, $1 a ton additional.

Other Ferroalloys

Ferrotungsten, per lb. wo. del., carloads	94c.
Ferrotungsten, less carloads	$1.00
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	9.50c.
Ferrochromium, 2% carbon	16.50 to 17.00c.
Ferrochromium, 1% carbon	17.50c. to 18.00c.
Ferrochromium, 0.10% carbon	19.50c. to 20.00c.
Ferrochromium, 0.06% carbon	20.00c. to 20.50c.
Ferrovanadium, del., per lb. contained Va.	$2.60 to $2.80
Ferrocarbontitanium, 15 to 18% per net ton, f.o.b. furnace in carloads	160.00
Ferrophosphorus, electric, or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton with $2 unitage	50.00
Ferrophosphorous, electric, 24% f.o.b. Anniston, Ala., per gross ton with $2.75 unitage	65.00
Ferromolybdenum, per lb. Mo., del.	95c.
Calcium molybdate, per lb. Mo., del.	80c.
Silico spiegel, per ton, f.o.b. furnace, car lots	$36.00
Ton lots or less, per ton	41.00
Silico-manganese, gross ton, delivered:	
2.50% carbon grade	85.00
2% carbon grade	90.00
1% carbon grade	100.00
Spot prices	$5 a ton higher

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range, Bessemer, 51.5% iron	$4.80
Old range, non-Bessemer, 51.50% iron	4.65
Mesabi Bessemer, 51.50% iron	4.65
Mesabi, non-Bessemer, 51.50% iron	4.50
High phosphorous, 51.50% iron	4.40

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron, low phos., copper free, 55 to 58% iron, dry Spanish or Algerian	9c.
Iron, low phos., Swedish, average 68½% iron	9.50c.
Iron, basic or foundry, Swedish, average, 65% iron	9c.
Iron, basic or foundry, Russian, aver. 65% iron (nom.)	9c.
Manganese, Caucasian, washed 52%	22c.
Manganese, African, Indian, 44-48%	20c.
Manganese, African, Indian, 49-51%	21c.
Manganese, Brazilian, 46 to 48½	17c.

	Per Net Ton Unit
Tungsten, Chinese wolframite, duty paid*	$12.00
Tungsten, domestic scheelite*	$11.00 to $12.00

	Per Gross Ton
Chrome, 45%, Cr_2O_3, crude, c.i.f. Atlantic Seaboard	16.00
Chrome, 48%, Cr_2O_3, c.i.f. Atlantic Seaboard	18.00

*Quotations nominal in absence of sales.

Fluorspar

	Per Net Ton
Domestic, washed gravel, 85-5 f.o.b. Kentucky and Illinois mines	$15.00
No. 2 lump, 85-5, f.o.b. Kentucky and Illinois mines	16.00
Foreign, 80% calcium fluoride, not over 5% silicon, c.i.f. Atlantic port, duty paid	18.50
Domestic, No. 1 ground bulk, 85 to 98% calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines	30.00

Iron and Steel Scrap

PITTSBURGH

Per gross ton delivered consumers' yards:

No. 1 heavy melting steel	$11.75 to $12.25
No. 2 heavy melting steel	10.25 to 10.75
No. 2 railroad wrought	11.75 to 12.25
Scrap rails	11.75 to 12.25
Rails 3 ft. and under	14.00 to 14.50
Sheet car crops, ordinary	13.00 to 13.50
Compressed sheet steel	11.75 to 12.00
Hand bundled sheet steel	10.25 to 10.75
Hvy. steel axle turnings	10.25 to 10.75
Machine shop turnings	8.00 to 8.50
Short shov. steel turnings	7.50 to 8.00
Short mixed borings and turnings	7.50 to 8.00
Cast iron borings	7.50 to 8.00
Cast iron carwheels	11.00 to 11.50
Heavy breakable cast	10.25 to 10.75
No. 1 cast	11.00 to 11.50
Railr. knuckles and couplers	13.25 to 13.75
Rail. coil and leaf springs	13.25 to 13.75
Rolled steel wheels	13.25 to 13.75
Low phos. billet crops	15.00 to 15.50
Low phos. sheet bar crops	14.50 to 15.00
Low phos. plate scrap	14.00 to 14.50
Low phos. punchings	14.50 to 15.00
Steel car axles	13.50 to 14.50

CHICAGO

Delivered Chicago district consumers:

	Per Gross Ton
Heavy melting steel	$8.50 to $9.00
Shoveling steel	8.50 to 9.00
Hydraulic comp. sheets	$7.00 to $7.50
Drop forge flashings	6.50 to 7.00
No. 1 busheling	7.00 to 7.50
Rolled carwheels	9.50 to 10.00
Railroad tires	10.50 to 11.00
Railroad leaf springs	9.50 to 10.00
Axle turnings	7.50 to 8.00
Steel couplers and knuckles	9.50 to 10.00
Coil springs	10.50 to 11.00
Axle turnings (elec. fur.)	8.25 to 8.75
Low phos. punchings	11.50 to 12.00
Low phos. plates, 12 in. and under	11.50 to 12.00
Cast iron borings	5.25 to 5.75
Short shoveling turnings	5.25 to 5.75
Machine shop turnings	5.00 to 5.50
Rerolling rails	9.50 to 10.00
Steel rails, less than 3 ft.	11.00 to 11.50
Steel rails, less than 2 ft.	11.50 to 12.00
Angle bars, steel	9.50 to 10.00
Cast iron carwheels	9.50 to 10.00
Railroad malleable	9.75 to 10.25
Agricultural malleable	8.00 to 8.50

	Per Net Ton
Iron car axles	$11.00 to $11.50
Steel car axles	9.50 to 10.00
No. 1 railroad wrought	7.50 to 8.00
No. 2 railroad wrought	7.50 to 8.00

No. 2 busheling	$3.50 to	$4.00
Locomotive tires, smooth	8.50 to	9.00
Pipe and flues	4.25 to	4.75
No. 1 machinery cast	8.50 to	9.00
Clean automobile cast	8.00 to	8.50
No. 1 railroad cast	7.50 to	8.00
No. 1 agricultural cast	7.00 to	7.50
Stove plate	6.00 to	6.50
Grate bars	6.50 to	7.00
Brake shoes	8.00 to	8.50

PHILADELPHIA

Per gross ton delivered consumers' yards:

No. 1 heavy melting steel	....	$10.00
No. 2 heavy melting steel	8.00 to	8.50
No. 1 railroad wrought	....	11.00
Bundled sheets	8.00 to	8.50
Hydraulic compressed, new	9.50 to	10.00
Hydraulic compressed, old	6.00 to	6.50
Machine shop turnings	6.00 to	6.50
Heavy axle turnings	....	9.00
Cast borings	5.00 to	5.50
Heavy breakable cast	....	10.00
Stove plate (steel works)	....	8.00
No. 1 low phos. heavy	13.00 to	14.00
Couplers and knuckles	12.00 to	12.50
Rolled steel wheels	12.00 to	12.50
No. 1 blast furnace	5.00 to	5.50
Spec. iron and steel pipe	8.50 to	9.00
Shafting	14.00 to	14.50
Steel axles	11.50 to	12.00
No. 1 forge fire	....	10.00
Cast iron car wheels	10.50 to	11.00
No. 1 cast	11.00 to	11.50
Cast borings (chem.)	12.00 to	14.00
Steel rails for rolling	11.00 to	11.50

CLEVELAND

Per gross ton delivered consumers' yards:

No. 1 heavy melting steel	$9.00 to	$9.50
No. 2 heavy melting steel	8.50 to	9.00
Compressed sheet steel	8.50 to	9.00
Light bundled sheet stampings	6.50 to	7.00
Drop forge flashings	9.00 to	9.50
Machine shop turnings	7.00 to	7.50
Short shoveling turnings	7.50 to	8.00
No. 1 busheling	9.00 to	9.50
Steel axle turnings	7.50 to	8.00
Low phos. billet crops	12.50 to	13.00
Cast iron borings	7.00 to	7.50
Mixed borings and short turnings	7.00 to	7.50
No. 2 busheling	7.00 to	7.50
No. 1 cast	11.00 to	11.50
Railroad grate bars	6.50 to	7.00
Stove plate	7.50 to	8.00
Rails under 3 ft.	10.00 to	10.50
Rails for rolling	10.50 to	11.00
Railroad malleable	10.00 to	10.50
Cast iron carwheels	....	11.00

BUFFALO

Per gross ton, f.o.b. Buffalo consumers' plants:

No. 1 heavy melting steel	$9.00 to	$9.50
No. 2 heavy melting scrap	8.00 to	8.50
Scrap rails	8.50 to	9.00
New hydraul. comp. sheets	8.00 to	8.50
Old hydraul. comp. sheets	6.00 to	6.50
Drop forge flashings	8.00 to	8.50
No. 1 busheling	8.00 to	8.50
Hvy. steel axle turnings	8.50 to	9.00
Machine shop turnings	6.00 to	6.50
Knuckles and couplers	11.00 to	11.50
Coil and leaf springs	11.00 to	11.50
Rolled steel wheels	11.00 to	11.50
Low phos. billet crops	12.50 to	13.00
Short shov. steel turnings	7.00 to	7.50
Short mixed borings and turnings	6.25 to	6.75
Cast iron borings	6.25 to	6.75
No. 2 busheling	6.00 to	6.50
Steel car axles	11.00 to	12.00
Iron axles	11.00 to	12.00
No. 1 machinery cast	10 50 to	11.00
No. 1 cupola cast	10.00 to	10.50
Stove plate	8.75 to	9.25
Steel rails, 3 ft. and under	11.50 to	12.00
Cast iron carwheels	10.00 to	10.50
Industrial malleable	10.50 to	11.00
Railroad malleable	10.50 to	11.00
Chemical borings	9.00 to	10.00

BIRMINGHAM

Per gross ton delivered consumers' yards:

Heavy melting steel	....	$10.00
Scrap steel rails	....	9.00
Short shoveling turnings	....	5.50
Stove plate	7.00 to	7.50
Steel axles	11.00 to	11.50
Iron axles	11.00 to	11.50
No. 1 railroad wrought	....	7.00
Rails for rolling	....	10.50
No. 1 cast	9.00 to	9.50
Tramcar wheels	9.00 to	9.50
Cast iron borings, chem	....	8.00

ST. LOUIS

Per gross ton delivered consumers' yards:

Selected heavy steel	$9.00 to	$9.50
No. 1 heavy melting	8.00 to	8.50
No. 2 heavy melting	7.50 to	8.00
No. 1 locomotive tires	8.00 to	8 50
Misc. stand.-sec. rails	9.50 to	10.00
Railroad springs	10.00 to	10.50
Bundled sheets	6.00 to	6.50
No. 2 railroad wrought	8.00 to	8.50
No. 1 busheling	6.50 to	7.00
Cast iron borings and shoveling turnings	4.50 to	5.00
Rails for rolling	10.25 to	10.75
Machine shop turnings	4.25 to	4.75
Heavy turnings	5.50 to	6.00
Steel car axles	10.00 to	10.50
Iron car axles	12.50 to	13.00
Wrot. iron bars and trans.	9.00 to	9.50
No. 1 railroad wrought	6.25 to	6.75
Steel rails less than 3 ft.	11.50 to	12.00
Steel angle bars	11.50 to	12.00
Cast iron carwheels	6.75 to	7.25
No. 1 machinery cast	8.50 to	9.00
Railroad malleable	8.50 to	9.00
No. 1 railroad cast	8.00 to	8.50
Stove plate	6.50 to	7.00
Relay rails, 60 lb. and under	16.00 to	16.50
Relay, rails, 60 lb. and over	$20.00 to	$21.00
Agricult. malleable	9.00 to	9.50

BOSTON

Dealers' buying prices per gross ton:

No. 1 heavy melting steel	$5.50 to	$6.00
Scrap T rails	5.50 to	6.00
Machine shop turnings	2.50 to	2.75
Cast iron borings	4.00 to	4.25
Bundled skeleton, long	4.75 to	5.00
Forge flashings	4.75 to	5.00
Blast furnace scrap	4.75 to	5.00
Shafting	9.00 to	9.50
Steel car axles	8.50 to	9.00
Wrought pipe	3.50 to	4.00
Rails for rerolling	6.00 to	6.50
Cast iron borings, chemical	7.50 to	8.00

Per gross ton delivered consumers' yards:

Tertile cast	$10.00 to	$10.50
No. 1 machinery cast	10.00 to	10.50
Stove plate	6.25 to	6.50
Railroad malleable	11.00 to	12.00

NEW YORK

Dealers' buying prices per gross ton:

Prices in italics for loading on barge; all others for loading on cars.

No. 1 heavy melting steel	$6.50 to	*$7.50*
No. 2 heavy melting steel	5.50 to	*6.50*
Heavy breakable cast	6.25 to	6.50
No. 1 machinery cast	6.50 to	7.00
No. 2 cast	5.50 to	6.00
Stove plate	5.50 to	6.00
Steel car axles	10.00 to	10.50
No. 1 railroad wrought	7.50 to	8.00
No. 1 yard wrought, long	$6.50 to	$7.00
Spec. iron and steel pipe	4.50 to	5.00
Forge fire	5.50 to	6.00
Rails for rerolling	8.00 to	8.50
Short shoveling turnings	3.00 to	3.50
Machine shop turnings	2.50 to	3.00
Cast borings	4.50 to	4.75
No. 1 blast furnace	2.50 to	3.00
Cast borings (chemical)	11.00 to	11.50
Unprepared yard iron and steel	2.50 to	3.00

Per gross ton, delivered local foundries:

No. 1 machinery cast		$8.00
No. 1 hvy. cast (cupola size)		7.75
No. 2 cast		7.00

CINCINNATI

Dealers' buying prices per gross ton:

Heavy melting steel	$7.75 to	$8.50
Scrap rails for melting	8.50 to	9.00
Loose sheet clippings	4.75 to	5.25
Bundled sheets	5.75 to	6.25
Cast iron borings	5.75 to	6.25
Machine shop turnings	5.25 to	5.75
No. 1 busheling	6.00 to	6.50
No. 2 busheling	3.00 to	3.50
Rails for rolling	9.00 to	9.50
No. 1 locomotive tires	8.50 to	9.00
Short rails	11.25 to	11.75
Cast iron carwheels	7.75 to	8.25
No. 1 machinery cast	9.00 to	9.50
No. 1 railroad cast	8.50 to	9.00
Burnt cast	6.00 to	6.50
Stove plate	6.00 to	6.50
Agricultural malleable	8.00 to	8.50
Railroad malleable	8.50 to	9.00

DETROIT

Dealers' buying prices per gross ton:

Meavy melting steel	$7.00 to	$7.50
Borings and short turnings	5.75 to	6.25
Long turnings	5.25 to	5.75
No. 1 machinery cast	7.50 to	8.00
Automotive cast	9.50 to	10.00
Hydraul. comp. sheets	7.00 to	7.50
Stove plate	5.75 to	6.25
New factory busheling	5.75 to	6.25
Old No. 2 busheling	4.50 to	5.00
Sheet clippings	4.50 to	5.00
Flashings	5.50 to	6.00
Low phos. plate scrap	7.50 to	8.00

CANADA

Dealers' buying prices per gross ton:

	Toronto	Montreal
Heavy melting steel	$5.50	$5.50
Rails, scrap	6.00	4.50
Machine shop turnings	2.50	2.50
Boiler plate	4.50	4.50
Heavy axle turnings	2.50	2.50
Cast borings	3.00	3.00
Steel borings	2.00	2.00
Wrought pipe	2.50	2.50
Steel axles	4.50	6.00
Axles, wrought iron	4.50	6.50
No. 1 machinery cast	7.75	9.00
Stove plate	4.50	5.00
Standard carwheels	7.25	7.00
Malleable	6.75	7.00

Warehouse Prices for Steel Products

PITTSBURGH

	Base per Lb.
Plates	3.05c.
Structural shapes	2.85c.
Soft steel bars and small shapes	2.85c.
Reinforcing steel bars	3.00c.
Cold-finished and screw stock—	
Rounds and hexagons	3.20c.
Squares and flats	3.20c.
Hoops and bands, under ¼ in.	3.10c.
Hot-rolled annealed sheets (No. 24), 25 or more bundles	3.15c.
Galv. sheets (No. 24), 25 or more bundles	3.70c.
Hot-rolled sheets (No. 10)	2.85c.
Galv. corrug. sheets (No. 28), per square (more than 3750 lb.)	$3.32
Spikes, large	2.90c.
Small	2.65c.
Boat	2.90c.
Track bolts, all sizes, per 100 count,	65 per cent off list.
Machine bolts, 100 count,	65 per cent off list.
Carriage bolts, 100 count,	65 per cent off list.
Nuts, all styles, 100 count,	65 per cent off list.
Large rivets, base per 100 lb.	$3.25
Wire, black, soft ann'l'd, base per 100 lb.	2.90
Wire, galv. soft, base per 100 lb.	3.35
Common wire nails, per keg	2.65
Cement coated nails, per keg	2.65

On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applied to orders of 400 to 9999 lb.

CHICAGO

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	2.90c.
Cold-fin. steel bars and shafting	
Rounds and hexagons	3.25c.
Flats and squares	3.25c.
Bands, 3/16 in. (in Nos. 10 and 12 gages)	3.20c.
Hoops (No. 14 gage and lighter)	3.20c.
Hot-rolled annealed sheets (No. 24)	3.70c.
Galv. sheets (No. 24)	4.30c.
Hot-rolled sheets (No. 10)	2.85c.
Spikes (9/16 in. and lighter)	3.50c.
Track bolts	4.05c.
Rivets, structural (keg lots)	3c.
Rivets, boiler (keg lots)	3.10c.
	Per Cent Off List
Machine bolts	60 and 5
Carriage bolts	60 and 5
Coach and lag screws	60 and 5
Hot-pressed nuts, sq., tap. or blank	60 and 5
Hot-pressed nuts, hex., tap. or blank	60 and 5
Hex. head and cap screws	85 and 10
Cup point set screws	75
Flat head bright wood screws	50 and 10
Spring cotters	60 and 10
Stove bolts in full packages	72½
Rd. hd. tank rivets, 7/16 in. and smaller	65
Wrought washers	$3.50 off list
No. 8 black ann'l'd wire per 100 lb.	$3.75
Com. wire nails, base per keg	2.70c.
Cement c't'd nails, base per keg	2.70c.

NEW YORK

	Base per Lb.
Plates	3.30c.
Structural shapes	3.27c.
Soft steel bars, small shapes	3.17c.
Iron bars	3.24c.
Iron bars, swed. charcoal	6.50c. to 7.00c.
Cold-fin. shafting and screw stock;	
Rounds and hexagons	3.79c.
Flats and squares	4.29c.
Cold-roll. strip, soft and quarter hard	4.00c.
Hoops	3.42c.
Bands	3.42c.
Hot-rolled sheets (No. 10)	3.17c.
Hot-rolled ann'l'd sheets (No. 24*)	3.65c.
Galvanized sheets (No. 24*)	4.25c.
Long terne sheets (No. 24)	4.75c.
Standard tool steel	12.00c.
Wire, black annealed (No. 10)	3.30c.
Wire, galv. annealed (No. 10)	4.05c.
Tire steel ⅓ x ⅓ in. and larger	3.40c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.75c.
Open hearth spring steel, bases	3.75c. to 10.00c.
Common wire nails, base, per keg	$3.00
	Per Cent Off List
Machine bolt, cut thread:	
¾ x 6 in. and smaller	60
1 x 30 in. and smaller	60
Carriage bolts, cut thread:	
½ x 6 in. and smaller	60
¾ x 20 in. and smaller	50
	Per 100 Ft.
Boiler tubes:	
Lap welded, 2-in.	$18.05
Seamless welded, 2-in.	19.24
Charcoal iron, 2-in.	24.94
Charcoal iron, 4-in.	63.65

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

ST. LOUIS

	Base per Lb.
Plates and struc. shapes	3.34c.
Bars, soft steel or iron	3.14c.
Cold-fin. rounds, shafting, screw stock	3.59c.
Hot-rolled annealed sheets (No. 24)	3.94c.
Galv. sheets (No. 24)	4.54c.
Hot-rolled sheets (No. 10)	3.19c.
Black corrug. sheets (No. 24)	3.99c.
Galv. corrug. sheets	4.59c.
Structural rivets	3.59c.
Boiler rivets	3.69c.
	Per Cent Off List
Tank rivets, 7/16 in. and smaller	60
Machine and carriage bolts, lag screws, fitting up bolts, bolt ends, plow bolts, hot-pressed nuts, square and hexagon, tapped or blank, semi-finished nuts	
1000 lb. or over	60
200 to 999 lb.	55 and 5
100 to 199 lb.	50 and 5
Less than 100 lb.	50

PHILADELPHIA

	Base per Lb.
*Plates, ¼-in. and heavier	2.75c.
*Structural shapes	2.75c.
*Soft steel bars, small shapes, iron bars (except bands)	2.75c.
‡Reinforc. steel bars, sq., twisted and deformed	2.505c.
Cold-finished steel bars	3.58c.
*Steel hoops	3.30c.
*Steel bands, No. 12 to 3/16 in., incl.	3.05c.
Spring steel	5.00c.
†Hot-rolled annealed sheets (No. 24)	3.40c.
†Galvanized sheets (No. 24)	4.00c.
*Hot-rolled annealed sheets (No. 10)	2.95c.
Diam. pat. floor plates, ¼ in.	4.75c.
Swedish iron bars	6.25c.

These prices are subject to quantity differentials except on reinforcing and Swedish iron bars.

*Base prices subject to deduction on orders aggregating 4000 lb. or over.

†For 50 bundles or over.

‡For 5 tons or more, exclusive of cutting charge.

CLEVELAND

	Base per Lb.
Plates and struc. shapes	3.21c.
Soft steel bars	2.90c.
Reinforc. steel bars	2.00c. to 2.50c.
Cold-finished steel bars	3.25c.
Flat rolled steel under ¼ in.	3.26c.
Cold-finished strip	5.55c.
Hot-rolled annealed sheets (No. 24)	3.76c.
Galvanized sheets (No. 24)	4.36c.
Hot-rolled sheets (No. 10)	3.01c.
Black ann'l'd wire, per 100 lb.	$2.45
No. 9 galv. wire, per 100 lb.	2.80
Com. wire nails, base per keg	2.45

*Net base, including boxing and cutting to length.

CINCINNATI

	Base per Lb.
Plates and struc. shapes	3.30c.
Bars, soft steel or iron	3.10c.
New billet reinforc. bars	3.10c.
Rail steel reinforc. bars	3.10c.
Hoops and bands, 3/16 in. and lighter	3.35c.
Cold-finished bars	3.55c.
Hot-rolled annealed sheets (No. 24)	3.85c.
Galv. sheets (No. 24)	4.45c.
Hot-rolled sheets (No. 10)	3.10c.
Structural rivets	4.00c.
Small rivets	60 per cent off list
No. 9 ann'l'd wire, per 100 lb.	$3.00
Com. wire nails, base per keg (10 to 49 kegs)	2.65
Larger quantities	2.50
Cement c't'd nails, base 100-lb. keg	2.95
Chain, 1-in., per 100 lb.	8.35
	Net per 100 Ft
Seamless steel boiler tubes, 2-in.	$17.69
4-in.	41.23
Lap-welded steel boiler tubes, 2-in.	16.43
4-in.	38.31

BUFFALO

	Base per Lb.
Plates and struc. shapes	3.20c.
Soft steel bars	2.95c.
Reinforcing bars	1.95c.
Cold-fin. flats and sq.	3.25c.
Rounds and hex.	3.25c.
Cold-rolled strip steel	5.25c.
Hot-rolled annealed sheets (No. 24)	3.25c.
Galv. sheets (No. 24)	4.00c.
Bands	3.20c.
Hoops	3.25c.
Hot-rolled unannealed sheets	3.10c.
Com. wire nails, base per keg	$3.00
Black wire, base per 100 lb.	2.25

BOSTON

	Per Lb.
Beams, channels, angles, tees, zees	3.42c.
H beams and shapes	3.42c.
Plates—sheared, tank and univ. mill, ¼ in. thick and heavier	3.42c.
Floor plates, diamond pattern	5.18c.
Bar and bar shapes (mild steel)	3.25c.
Bands 3/16 in. thick and No. 12 ga. incl.	3.50c. to 4.50c.
Half rounds, half ovals, ovals and bevels	4.50c.
Tire steel	4.50c.
Cold-finished rounds and hexagons	3.70c.
Cold-rolled strip steel	5.20c.
Cold-finished squares and flats	4.20c.
Blue annealed sheets, No. 10 ga.	3.25c.
One pass cold-rolled sheets No. 24 ga.	3.50c.
Galvanized steel sheets, No. 24 ga.	4.60c.
Lead coated sheets, No. 24 ga.	5.65c.

Prices delivered by truck in metropolitan Boston, subject to quantity differentials.

PACIFIC COAST

	Base per Lb		
	San Francisco	Los Angeles	Seattle
Plates, tank and U.M.	3.50c.	3.40c.	3.40c.
Shapes, standard	3.50c.	3.40c.	3.40c.
Wide-flanged beams and columns	3.70c.	3.60c.	3.60c.
Soft steel bars	3.55c.	3.40c.	3.40c.
Reinforcing bars	3.10c.	3.15c.	3.50c.
Hot-rolled annealed sheets (No. 24)	4.25c.	4.15c.	4.25c.
Hot-rolled sheets (No. 10)	3.75c.	3.65c.	3.65c.
Galv. sheets (No. 24)	4.85c.	4.75c.	4.85c.
Struc. rivets, ½ in. and larger	6.25c.	6.00c.	5.00c.
Cold finished steel			
Rounds	5.95c.	5.95c.	4.75c.
Squares and hexagons	7.20c.	7.20c.	6.00c.
Flats	7.70c.	7.70c.	7.00c.
Common wire nails —base per keg	$3.20	$3.20	$3.20
less carload			

All items subject to differentials for quantity.

Steel Corporation's Shipments Off Sharply

SHIPMENTS of finished steel products by the subsidiary companies of the United States Steel Corpn. declined sharply in November, amounting to 430,358 tons, as compared with 572,897 tons in October, and with 275,594 tons in November, 1932. The decrease of 142,539 tons or 25 per cent is partially attributable to seasonal factors and is in line with the decline in steel ingot production during the month.

November shipments were at the rate of 21.3 per cent of the Corporation's capacity of 1,616,000 tons annually, as compared with 35.5 per cent in October.

MONTHLY SHIPMENTS OF STEEL PRODUCTS BY UNITED STATES STEEL CORPN.

(In Net Tons)

Month	1930	1931	1932	1933 Shipments	1933 Per Cent of Capacity
January	1,104.168	800,031	426,271	285,138	17.7
February	1,141,912	762,522	413,001	275,929	18.5
March	1,240,171	907,251	388,579	256,793	15.3
April	1,188,456	878,558	395,091	335,321	21.6
May	1,203,916	764,178	338,202	455,302	27.1
June	984,739	653,104	324,746	603,937	37.4
July	946,745	593,900	272,448	701,322	45.1
August	947,402	573,372	291,688	668,155	39.8
September	867,282	486,928	316,019	575,161	35.6
October	784,648	476,032	310,007	572,897	35.5
November	676,016	435,697	275,594	430,358	21.3
December	579,098	351,211	227,576	.....	...
Less yearly adjustment	(40,259)	(6,040)	(5,160)	.....	...
Total for year....	11,624,294	7,676,744	3,974,062	.....	...

Cast Iron Pipe

Melrose, Mass., has awarded 6000 ft. of 16-in. pipe to the Warren Foundry & Pipe Corpn.

Paxton, Mass., has awarded 26,000 ft. of 6 to 10-in. to Central Foundry Co.

Shrewsbury, Mass., has awarded 17,500 ft. of 6 to 10-in. to R. D. Wood & Co.

Lexington, Mass., has placed 3000 ft. of 10 to 12-in. with the Warren Foundry & Pipe Corpn.

Worcester, Mass., has awarded 8000 ft. of 24-in to R. D. Wood & Co.

New Bedford, Mass., will ask bids soon on a round tonnage of 24-in.

Waltham, Mass., has placed 450 tons with R. D. Wood & Co.

Cambridge, Mass., plans extensions in water pipe line system. Cost about $100,000.

Guthrie, Ky., plans pipe line for municipal water supply. Cost $75,000. Financing will soon be arranged. Hart, Freeland & Roberts, Inc., Independent Life Building, Nashville, Tenn., is engineer.

Senoia, Ga., plans about 12,500 ft. of 2 to 18-in. for water supply. J. B. McCrary Corpn., Atlanta, Ga., is consulting engineer.

Red River County Fresh Water Supply District No. 1, Detroit, Tex., plans water pipe line system. Cost $53,000. Financing is being arranged. D. C. Wansley, Thomas Building, Dallas, Tex., is engineer.

Somerset, Ohio, plans pipe line for water system. Cost $55,000. Federal loan is being arranged. Jennings & Lawrence, 12 North Third Street, Columbus, Ohio, are engineers.

Wilmette, Ill., has taken bids on 900 tons of 24-in. Loan has been obtained.

Aurora, Ill., plans extensions to its water main.

Green Bay, Wis., has dropped its plans to use 36-in. cast iron pipe for a sewer and will lay concrete.

Chippewa, Wis., has authorized purchase of quantity of 6-in. for extension of water supply line on Cedar Street. Board of Public Works is in charge.

Duquoin, Ill., plans pipe line for municipal water system, including 300,000-gal. steel tank and tower and filtration plant. Cost $348,000. Application has been made for Federal loan. Russell & Axon, 4903 Delmar Boulevard, St. Louis, are consulting engineers.

Weiser, Idaho, plans installation of new line for main water supply. Cost about $17,000. Financing has been arranged.

Redwood City, Cal., has awarded 120 tons to American Cast Iron Pipe Co.

Yakima, Wash., has awarded 140 tons to Pacific States Cast Iron Pipe Co.

Alhambra, Cal., will take bids Dec. 19 on 194 tons of 20-in.

Santa Cruz, Cal., has taken bids on 740 tons of 10 and 14-in.

Seattle will take bids Dec. 21 on 770 tons for Railroad Avenue seawall.

Huntington Park, Cal., will take bids Dec. 21 on 433 or 534 tons of 6 to 12-in.

Gray Iron Code Is Making Progress

THE post-hearing conferences with the various departments of NRA in connection with the gray iron code have progressed very satisfactorily; in fact, much more satisfactorily than is the case with most codes embracing an industry of any size. Differences of opinion have been adjusted, and of particular interest is the fact that a number of groups, who were previously giving consideration to filing separate codes, have thrown their weight behind the gray iron code and are now taking an active part in assisting the code or steering committee in completing the gray iron code.

Some change is being considered in the section carrying the trade practices, which would reduce slightly the number of trade practices and consolidate others. This, it is felt, will make for smoother compliance and a clearer understanding on the part of everyone concerned.

In the account of the public hearing of the gray iron code, reference was made in THE IRON AGE to objections filed by L. L. Balleisen of Brooklyn, who was erroneously reported as a member of the Gray Iron Founders' Society. Mr. Balleisen represents a group of 14 foundries, all operating closed shops, and has no connection with the Gray Iron Founders' Society, Inc.

NON-SHRINK, OIL HARDENING

TOOL STEEL TUBING

The job of making ring dies, cutting dies, bushings spacers, etc., is half done when you start with Bissett Tool Steel Tubing. There is a size carried in stock to meet every requirement up to 12" O.D. and 2" wall thickness. Larger sizes can be supplied.

It eliminates forging, does away with annealing difficulties and cuts down machining cost.

We also supply special tubing to S.A.E. 52100 and S.A.E. 4615 analysis for Ball Bearing purposes.

Manufacturers of BISCO Tungsten Carbide and Tantalum Carbide drawing dies for wire, rod and tubing.

THE BISSETT STEEL CO., INC.

945 E. 67th STREET, CLEVELAND, O.

Cincinnati Pittsburgh Buffalo

PLANT EXPANSION AND EQUIPMENT BUYING

NEW ENGLAND

School Board, Milton, Mass., plans manual training department in new multi-story junior and senior high school. Cost about $200,000. Ralph G. Stebbins, Milton, is architect.

Standard Refrigerator Mfg. Corpn., Providence, R. I., has been organized by Sidney and Fred E. Gluck, 152 Lippitt Street, to manufacture refrigerators and parts.

Board of Selectmen, Paxton, Mass., plans new pumping plant, steel storage tank and tower of 365,000 gal. capacity, pipe lines, etc., for extensions and improvements in municipal water system. Cost about $85,000. Financing has been arranged. H. A. Symonds, 70 State Street, Boston, is consulting engineer.

Fire Department, 60 Bristol Street, Boston, plans new one-story repair and equipment shop. Cost $100,000 with machinery. Also new fire alarm shop, to cost $205,000 with equipment. Appropriations are being arranged. Fire Commissioner McSweeney is in charge.

Vacon Electro Plating Co., Waterbury, Conn., has been organized by Thomas Vaccaro, Waterbury, and associates, to operate an electroplating works.

Bowler Brewing Co., 81 Lafayette Street, Worcester, Mass., plans new one-story bottling plant, work to begin early next year. J. A. Donahue is head.

NORTH ATLANTIC

Mathieson Alkali Works, Inc., 250 Park Avenue, New York, has acquired more than 1000 acres near Lake Charles, La., with water frontage on Lake Charles ship channel, as site for new plant for manufacture of caustic soda, soda ash and allied products. Plant will include power house, electric pumping plant, machine shop and other units. A 20-mile steel pipe line will be built from oil field district at Hackberry, La., to plant for brine supply. Docks, storage and distributing buildings, with loading, elevating and conveying equipment, will be constructed. Plant is scheduled to be ready for service in about nine months. Cost about $5,000,000 with equipment. Stone & Webster Engineering Corpn., 90 Broad Street, New York, is engineer and will supervise erection.

Department of Water Supply, Gas and Electricity, Municipal Building, New York, plans new electric-operated pumping plant for high-pressure water supply for fire service in Coney Island district. Cost about $500,000 with pipe lines, etc. Financing will be arranged through Federal loan.

General Superheater Corpn., New York, has been organized by Edward A. Geoghegan, 127 West Seventieth Street, and Argyll R. Parsons, Millwood Road, Mount Kisco, N. Y., to manufacture superheaters, parts, etc.

Board of Education, Manhasset, N. Y., plans manual training department in new multi-story high school, for which bids will be asked on general contract in about 60 days. Cost $450,000. Tooker & Marsh, 101 Park Avenue, New York, are architects.

Mavis Bottling Co. of America, Inc., 140 Cedar Street, New York, plans new distilling plant at works at Long Island City, operated in name of Mavis Bottling Co. of New York. Cost over $50,000. Company recently arranged for stock issue of $250,000 for this and other expansion, and has acquired controlling interest in Highland Brewery, Inc., Newburgh, N. Y. James M. Elliott is president.

North Side Plating & Polishing Works, Inc., Brooklyn, has been organized by Benjamin Glick, 519 East Fifty-first Street, and associates, to operate a metal-finishing, plating and polishing works. Company will take over organization of same name at 154 North Seventh Street.

Long Island Oil Terminal Corpn., Fresh Pond Road, Astoria, L. I., plans new bulk oil storage and distributing plant at Nineteenth Avenue and Thirty-seventh Street. Cost over $25,000 with tanks, pumping machinery and auxiliary equipment.

General Banknote Engineering Co., Inc., New Rochelle, N. Y., A. Claxton Cary, New Rochelle, president, recently organized to manufacture steel plate engraving and printing equipment, is arranging for stock issue of $100,000 for plant facilities and operations.

Great Eastern Breweries, Inc., 92-94 Main Street, Manville, N. J., L. P. Knopf, in charge, organized a few months ago, will soon take bids on general contract for six-story plant, with two two-story wing units and steam power house. Cost over $350,000 with equipment. B. Sumner Gruzen, 972 Madison Avenue, New York, is architect; C. J. Kupper, company address, is engineer.

Reliable Oil Burner Corpn., Bogota, N. J., has been organized by Carl Peterson and Julius J. Kelemen, 78 West Main Street, capital $100,000, to manufacture oil burners and oil-burning equipment.

Mount Rose Distilling Co., Trenton, N. J., recently organized as a subsidiary of Tastyeast, Inc., Trenton, has approved plans for new gin distilling plant. It is proposed to have unit in service by end of year. Cost over $65,000.

Board of Education, Dunellen, N. J., plans manual training department in new two-story and basement high school. Cost about $300,000 with equipment. Financing is being arranged. Korff, Poggi & Bragdon, 203 Park Avenue, Plainfield, N. J., are architects.

Sun Oil Co., 1608 Walnut Street, Philadelphia, has plans for new bulk oil storage and distributing plant at North Warwood, W. Va. Cost about $40,000 with tanks and equipment.

Duplex Foundries, Inc., Philadelphia, has been organized, capital $200,000, under direction of J. Vernon Pimm, Land Title Building, representative, to manufacture metal castings.

Philadelphia Steam Co., Seventeenth and Sansom Streets, Philadelphia, is arranging financing for $175,000, part of fund to be used for expansion, including pipe lines.

City Council, Sellersville, Pa., plans installation of pumping machinery and auxiliary equipment in connection with new waterworks filtration plant. Cost about $40,000. Albright & Friel, Inc., 246 South Fifteenth Street, Philadelphia, is consulting engineer.

Rahn Brewing Co., Tamaqua, Pa., Frank J. Pancheri, president, is arranging sale of stock for $62,500, part of proceeds to be used for expansion.

OHIO AND INDIANA

All-Metal Universal Joint Co., 1553 East Fifty-fifth Street, Cleveland, has let general contract to George A. Rutherford Co., 2725 Prospect Avenue, for one-story plant unit, 29 x 200 ft.

Great Lakes Distilleries Co., Cleveland, care of F. H. Eggers, 11505 Lake Avenue, recently organized by Mr. Eggers and Howard E. Elliott, plans new distillery at 5201 Dennison Avenue, where two three-story industrial buildings and adjoining land have been acquired. Units will be remodeled and several new structures erected, including grain elevator and cooperage works. Cost about $350,000 with equipment. F. J. Hronek, 5208 Harvard Avenue, is architect.

Common Council, Pemberville, Ohio, plans installation of pumping machinery and auxiliary equipment, pipe lines, etc., for new municipal waterworks. Bond issue of $100,000 has been authorized.

Home Packing Co., Union Stock Yards, Toledo, Ohio, meat packer, has plans for one-story addition, 30 x 160 ft. Cost about $45,000 with equipment.

Construction Quartermaster, Patterson Field, Fairfield, Ohio, has plans for new steam power plant for central heating, including pipe lines, etc. Cost about $200,000 with equipment. A. M. Kinney, Inc., Carew Tower, Cincinnati, is consulting engineer.

Cleveland Ball Bearing Co., Cleveland, has been organized by I. R. Morris, Cleveland, and associates, to manufacture ball bearings and kindred products. New company will take over organization of same name at 1369 West Ninth Street.

City Council, Cuyahoga Falls, Ohio, has plans for new municipal electric light and power plant. Cost $480,000 with equipment. Bonds have been approved and financing is being arranged. N. C. Bell, City Hall, is city engineer.

Hannton Township Board of Education, Valley Crossing, Ohio, will install manual training department in new two-story high school. Cost $137,500 with equipment. Financing is being completed. Richards, McCarty & Bulford, 584 East Broad Street, Columbus, Ohio, are architects.

City Council, Kenton, Ohio, has applied for Federal loan of $442,000 for new municipal electric light and power plant, and plans early erection. H. P. Jones, Second National Bank Building, Toledo, Ohio, is consulting engineer.

Board of Public Works, Anderson, Ind., plans installation of pumping machinery and auxiliary equipment, digesters, loaders and other mechanical-handling equipment in new sewage disposal works and treatment plant. Cost about $750,000 with machinery. Project has been ordered by State Board of Health. Financing will soon be arranged.

City Council, Madison, Ind., plans installation of pumping machinery and auxiliary equipment, pipe lines, etc., for extensions and improvements in municipal waterworks. Bond issue of $60,000 is being arranged.

WESTERN PENNA.

Atlantic Refining Co., Chamber of Commerce Building, Pittsburgh, has plans for extensions in bulk oil storage and distributing plant at West Brownsville, Pa., with tanks and other equipment. Cost over $45,000 with equipment. Main offices are at 260 South Broad Street, Philadelphia.

Standard Sanitary Mfg. Co., Bessemer Building, Pittsburgh, a unit of American Radiator & Standard Sanitary Corpn., plans one-story addition to Canadian branch plant at Toronto, Ont., 155 x 265 ft. Cost over $60,000 with equipment.

Schenley Products Co., Clark Building, Pittsburgh, will carry out expansion program at branch distilling plant at Frankfort, Ky., operated in name of George T. Stagg Co., to increase output from 350 to 500 bbl. a day.

General Electric Co., Schenectady, N. Y., has perfected new refrigerated automobile truck, and will concentrate production in new line at branch plant at Erie, Pa., where electric refrigerators and allied products are manufactured.

Meadville Distilling Co., Meadville, Pa., will take bids soon on general contract for new two-story and basement plant, 45 x 150 ft. Cost over $100,000 with equipment. Paul Matzinger & Co., Empire Building, Cleveland, are architects and engineers.

MIDDLE WEST

Arrow Mill Co., 4420 West Twenty-sixth Street, Chicago, manufacturer of battery separators and kindred products, has let contract to F. J. Miller, 8240 Loomis Street, for one-story addition, 60 x 120 ft., for storage and distribution. Loewenberg & Loewenberg, 111 West Monroe Street, are architects.

United States Engineer Office, Rock Island, Ill., asks bids until Dec. 21 for lock No. 22, Mississippi River, near Saverton, Mo., including 193,070 lb. steel forgings, 100,287 lb. steel castings, 36,487 lb. alloy steel castings, 31,267 lb. iron castings, 6581 sq. ft. steel floor grating, eight operating machines, four miter-gate machinery recess drains, gate valves, central control station structure and auxiliary equipment (Circular 73).

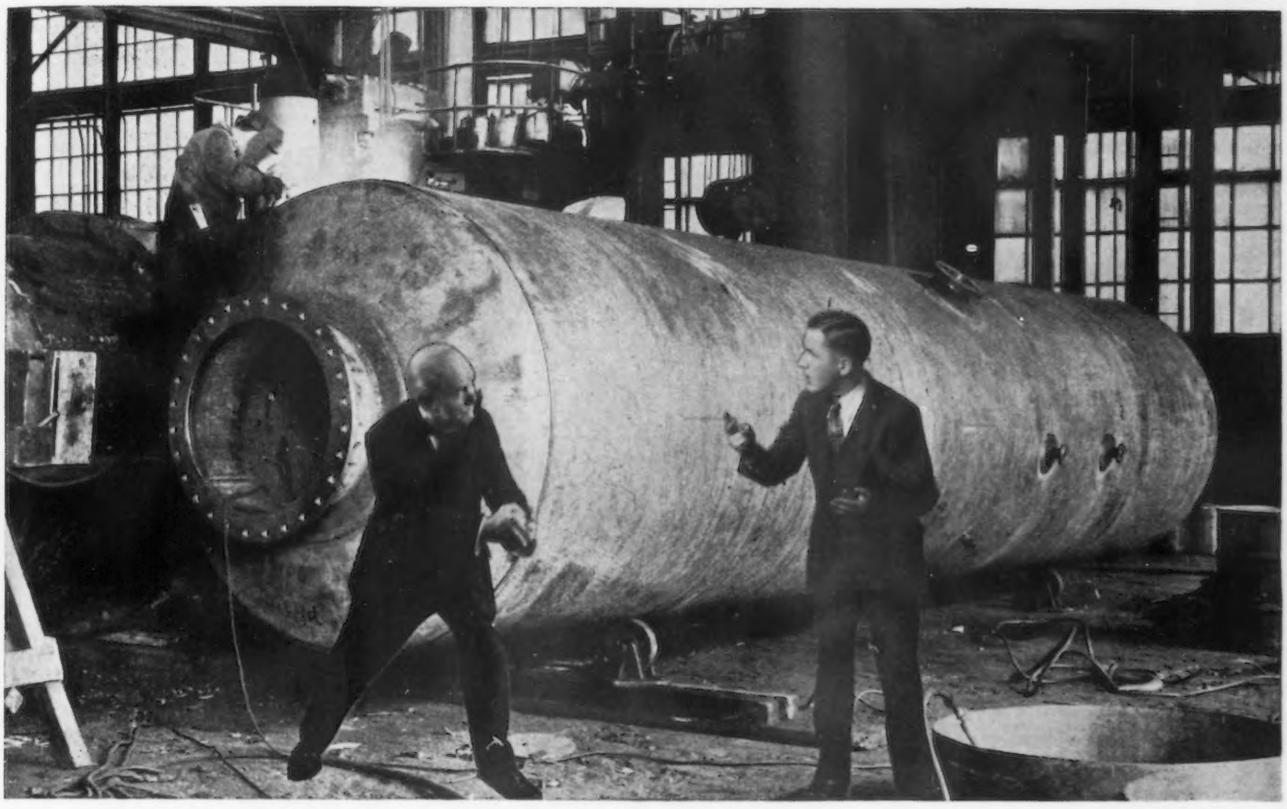
City Council, Onawa, Iowa, plans extensions and improvements in municipal electric light and power plant, with Diesel engine units to replace present reciprocating steam engines, and accessory equipment. Cost $50,000. Financing is being arranged. Nixon & Reynolds, Grain Exchange Building, Omaha, Neb., are consulting engineers.

Burtmier Mfg. Corpn., 1735 Carroll Avenue, Chicago, has been organized by Burt B. Cochran and Charles Shaw, to manufacture coin-controlled vending devices and equipment.

Common Council, Lidgerwood, N. D., plans municipal electric light and power plant. Cost about $75,000 with equipment. Financing is being arranged. S. O. Quammen is city engineer.

Board of Education, Clinton, Iowa, plans manual training department in new two-story and basement junior high school, for which

WELDING OF STAINLESS STEEL ATTRACTS POP AND LAD



"This, Lad, to my knowledge is the first large pressure vessel of arc-welded stainless steel construction. There's 20 tons of 18-8 stainless and about 1000 feet of welding in this job. The vessel is 59 feet 6 inches long, 6 feet 6 inches in diameter, with shell of $\frac{3}{8}$-inch plate.

"To my mind, its construction is a tribute to the progressiveness and engineering skill of the Foster Wheeler Corporation who are building it."

"You're right, Pop, and it's also a tribute to the shielded arc process of welding which made possible welds having the same physical characteristics as the 18-8 stainless.

"With Lincoln welders and *'Stainweld'* electrodes, as used by the Foster Wheeler Corporation you can get just such welds. That's why in many large fabricating shops you'll find Lincoln welders and *'Stainweld'* electrodes being used for welding of stainless steel and steels clad with stainless."

● *For complete information on welding procedure for 18-8 stainless steel write*

LINCOLN

THE LINCOLN ELECTRIC COMPANY, CLEVELAND, OHIO

Largest Manufacturers of Arc Welding Equipment in the World

W-60

bids have been asked on general contract. Cost about $300,000. A. H. Morrell, Howes Building, Clinton, is architect. Keffer & Jones, Masonic Temple, Des Moines, Iowa, are associate architects.

Vaporite Valve & Mfg. Co., 77 West Washington Street, Chicago, has been organized by Arthur S. Kaplan and Miles Price, to manufacture valves and kindred engineering specialties.

Common Council, Villisca, Iowa, is arranging for Federal loan for $150,000 for new municipal electric light and power plant, using Diesel engine-generating units, work to begin soon. Burns & McDonnell Engineering Co., 107 West Linwood Boulevard, Kansas City, Mo., is consulting engineer.

Common Council, Wahoo, Neb., plans new pumping plant for municipal water system, with pipe lines, etc. Financing for $68,000 is being arranged. Work is scheduled to begin soon.

BUFFALO DISTRICT

Niagara Amphibious Aircraft Corpn., 926 Ellicott Square, Buffalo, organized recently to manufacture new type of airplane, is arranging for establishment of local plant for parts production and assembling. Henry O. Sederburg is president, and Reginald F. Penton, secretary and treasurer. Howard J. Heindell, formerly engineer for Curtiss Aeroplane Co., Buffalo, will act in like capacity for new organization.

Yeager "Y" Products Corpn., Williamsville, N. Y., has been organized by Henry M. Yeager, Indian Trail Road, and associates, to manufacture sheet metal products.

New York State Electric & Gas Corpn., Ithaca, N. Y., plans new electric distributing lines between West Eaton and Georgetown, N. Y. Cost about $30,000 with equipment. Additions to gas pipe lines also are being considered.

Board of Water and Light Commissioners, Wellsville, N. Y., is considering new municipal steam power plant for central heating in business district. Cost about $60,000 with equipment, pipe lines, etc.

MICHIGAN DISTRICT

American Electrical Heater Co., 6125 Woodward Avenue, Detroit, has let general contract to Albert A. Albrecht Co., Penobscot Building, for three-story and basement plant. Cost over $45,000 with equipment.

City Council, Holland, Mich., plans installation of pumping machinery and auxiliary equipment, pipe lines, etc., for extensions and improvements in municipal water and sewerage systems. Fund of $65,000 is being arranged.

DeFoe Boat & Motor Works, Bay City, Mich., plans two new one-story shop and construction units at shipyard. Cost over $50,000 with equipment. Expansion will be carried out for construction of two 165-ft. coast guard cutters for United States Coast Guard, Washington, for which company is securing contract at about $563,800 each. A third new shop unit is also being considered.

City Council, Gladstone, Mich., F. R. Buechner, city manager, is considering new municipal electric light and power plant. Cost about $75,000 with equipment.

WASHINGTON DISTRICT

Sherwood Distilling & Distributing Co., 212 East Lombard Street, Baltimore, has purchased former canning plant of Smith-Yingling Co., and will remodel for new distilling unit, with storage and distributing facilities.

Bureau of Yards and Docks, Navy Department, Washington, asks bids until Dec. 20 for new gasoline storage, pumping and distribution system at flying field, Quantico, Va. (Specification 7529); also complete electric light and power distributing system for same place (Specification 7527).

Celanese Corpn. of America, Amcelle, Md., manufacturer of cellulose rayon products, plans addition to mill No. 3. Cost about $400,000 with equipment. It is proposed to begin work this month. Headquarters are at 180 Madison Avenue, New York.

Town Council, Covington, Va., is considering new municipal electric light and power plant. Cost close to $300,000 with equipment. Financing will be arranged soon. Wiley & Wilson, Richmond, Va., are consulting engineers.

Board of District Commissioners, District Building, Washington, asks bids until Dec. 18 for one steel boiler for steam heating service.

Monumental Perfect Brewing Co., Lombard and Eaton Streets, Baltimore, has plans for extensions and improvements in brewery. Cost over $30,000 with equipment.

City Council, Martinsville, Va., plans installation of pumping machinery and auxiliary equipment for extensions and improvements in municipal waterworks. Fund of $70,000 is being arranged, including pipe lines, etc.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Dec. 19 for corrosion-resisting steel (Schedule 1300) for Boston and Mare Island navy yards.

SOUTHWEST

Louis Obert Brewing Co., 2700 South Twelfth Street, St. Louis, has asked bids on general contract for two and five-story bottling plant addition, 40 x 105 ft., and 24 x 40 ft. respectively. Cost about $70,000 with equipment.

Town Council, Fredericktown, Mo., has plans for new municipal electric light and power plant. Cost $132,525 with equipment. Federal loan in that amount is being secured. Burns & McDonnell Engineering Co., 107 West Linwood Boulevard, Kansas City, Mo., is consulting engineer.

Joplin Steam Heating Co., Joplin, Mo., plans new steam power plant and pipe line system for central heating service. Cost about $150,000 with equipment.

Union Sawmill Co., Huttig, Ark., a subsidiary of Frost Lumber Industries, Inc., Shreveport, La., has plans for rebuilding plant destroyed by fire several weeks ago. New motor-driven machinery will be installed. Cost over $100,000 with equipment.

Common Council, Anthony, Kan., is arranging financing for $60,000 by Federal loan, for new municipal electric light and power plant. Black & Veatch, Mutual Building, Kansas City, Mo., are consulting engineers.

City Council, Linden, Tex., asks bids until Dec. 19 for elevated steel tank and tower, pumping machinery and auxiliary equipment for municipal waterworks. Fred E. Hess, 507 First Avenue, Dallas, Tex., is consulting engineer.

City Council, San Angelo, Tex., plans municipal electric light and power plant, using Diesel engine-generator units. Cost over $100,000 with equipment. Financing will soon be arranged. Burns & McDonnell Engineering Co., 107 West Linwood Boulevard, Kansas City, Mo., is consulting engineer.

SOUTH CENTRAL

Common Council, Cookeville, Tenn., plans new municipal electric light and power plant for emergency service; also extensions and improvements in water and sewerage systems, including pumping machinery and other equipment, pipe lines, etc. Federal loan of $200,000 is being arranged.

Wright & Taylor Distilling Corp., Louisville, Thomas B. Bullitt, president, has engaged D. X. Murphy & Brothers, Louisville Trust Building, Louisville, architects, to draw plans for new multi-unit distillery. Cost close to $475,000 with equipment.

Old Kentucky Distillery Co., Louisville, has plans for new multi-unit plant near present distillery. Cost over $250,000 with equipment.

W. M. Smith & Co., Birmingham, mill supplies and machinery, plan new one-story storage and distributing plant, 50 x 162 ft. V. F. Howell is manager.

Common Council, Tuscumbia, Ala., plans electric power transmission system to Muscle Shoals hydroelectric power project of Government, with substation and local distribution system. Federal loan of $130,000 has been secured.

Common Council, Bernice, La., plans installation of pumping equipment, pipe lines, etc., for municipal water system. Bond issue of $40,000 has been voted. S. E. Huey, Monroe, La., is engineer.

SOUTH ATLANTIC

City Commission, DeLand, Fla., plans municipal electric light and power plant. Cost over $80,000 with equipment. Scofield Engineering Co., Commercial Trust Building, Philadelphia, Pa., is consulting engineer. Plans are also being considered for incinerator plant to cost about $50,000 with machinery.

City Council, Asheville, N. C., plans municipal airport, with hangars, repair shop, oil storage and distributing building and other field units. Cost over $100,000 with equipment. Robert L. Maynard is city engineer.

Golding Sons Co., Butler, Ga., operating clay-mining properties, plans installation of crushing machinery at plant to handle lump clay. E. P. Golding is head.

Southern Oil Burning Equipment Co., Charleston, S. C., has been organized by William P. Brock and Henry Chisolm, Charleston, to manufacture oil burners and oil-burning equipment.

Common Council, Senoia, Ga., plans installation of deep well pumping machinery and auxiliary equipment for extensions and improvements in municipal waterworks, including new pipe lines. Fund of $33,000 is being arranged. J. B. McCrary Corpn., Atlanta, Ga., is consulting engineer.

City Council, Greenwood, S. C., plans early call for bids for pumping machinery and auxiliary equipment, filtration machinery, pipe lines, etc., for municipal water system extensions. Fund of $200,000 has been arranged. Wiedeman & Singleton, Candler Building, Atlanta, Ga., are consulting engineers.

PACIFIC COAST

Fisher Body Corpn., West Seventy-third Street, Oakland, Cal., has let contract to Judson Pacific Co., foot of Park Avenue, for one-story addition. Cost about $25,000 with equipment. Alben Froberg, 1955 Webster Street, is architect. Company is a unit of General Motors Corpn.

O. C. Field Gasoline Corpn., 111 West Seventh Street, Los Angeles, has let contract to Fluor Corpn., 909 East Fifty-ninth Street, for new gasoline refining and absorption plant at Huntington Beach, Cal. Cost about $100,000 with machinery.

City Council, Crescent City, Cal., has plans for municipal electric light and power plant; also new municipal pumping plant, with pipe lines, etc., for water supply system. Federal loan for $300,000 is being arranged.

City Council, Portland, Ore., plans bulk municipal gasoline storage and distributing plant near city terminal No. 4, capacity about 3,000,000 gal. Cost $135,000 with tanks, pumping machinery and auxiliary equipment. Financing is being negotiated.

Pacific Brandy Co., Alviso, Cal., care of Fred L. Fehren, 25 North Second Street, San Jose, Cal., representative, recently organized by A. F. Pate and R. T. Padget, plans one-story winery and brandy plant at first noted place. Cost about $30,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Dec. 19 for 23,000 sq. ft. expanded sheet metal (Schedule 1301) for Mare Island Navy Yard; until Dec. 27, quantity of corrosion-resisting sheet and strip steel (Schedule 1374) for Puget Sound Navy Yard.

Board of Directors, Port of Vancouver, Vancouver, Wash., plans new two-story cold storage and refrigerating plant, 180 x 320 ft. Cost over $100,000 with machinery. Financing is being arranged. Charles Deako, 814 West Seventeenth Street, is engineer. Fred R. Brown is manager.

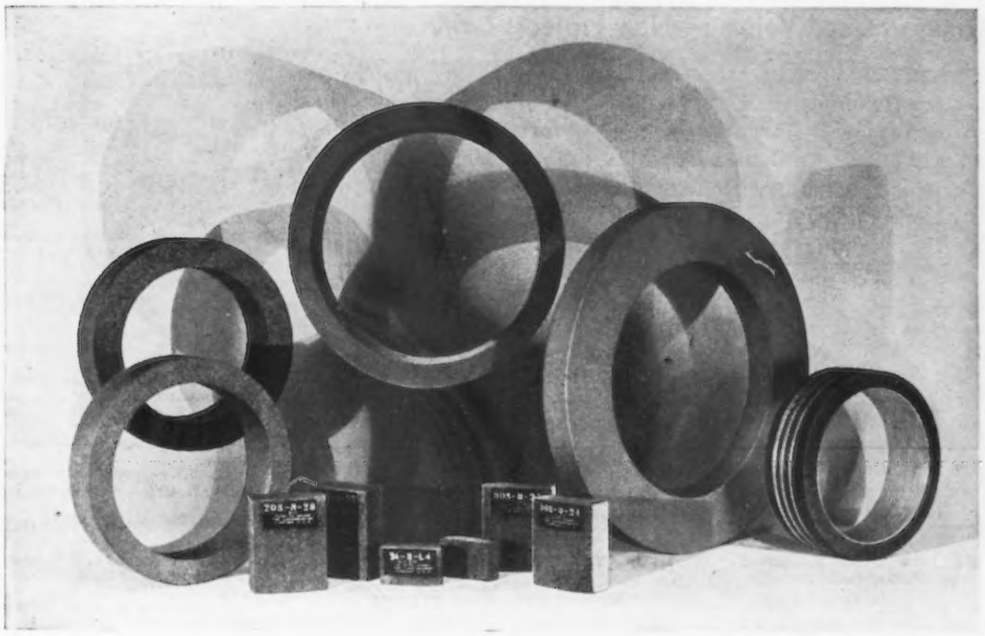
City Council, Boise, Idaho, plans installation of pumping plant for extensions and improvements in municipal water system, to cost $28,677 with pumping and auxiliary machinery; pipe lines will be installed in different parts of city, estimated at $1,296,854. Entire program, including water source development, will cost $1,500,000. Federal loan will be arranged at once. C. C. Stevenson is city engineer.

FOREIGN

Fuju Spinning Co., Tokyo, Japan, identified with Mitsubishi interests, same city, has acquired property in Nigata Prefecture as site for new cellulose rayon mill. Plant will include power house and machine shop, and an affiliated works for manufacture of heavy chemical specialties. Work will begin early next spring. Cost 20,000,000 yen (about $6,200,000) with equipment.

South African Railways and Harbors Administration, Johannesburg, South Africa, T. H. Watermeyer, general manager, will ask bids soon for new mechanical coaling plant, with turntables and other operating facilities. Cost about $88,000; also bids for interlocking and other railway signal equipment to cost about $170,000.

FOR THE GENERATION OF SURFACES OR PLANES



Carborundum and Aloxite Brand Ring Wheels

REG. U. S. PAT. OFF. REG. U. S. PAT. OFF.

Segmental Wheels and Segments

WHETHER it be a rough surfacing job where stock removal is the objective and finish and accuracy not essential—or whether it be a precision surfacing operation where stock removal rate is sacrificed for high finish and accuracy—there is always a Carborundum or Aloxite Brand Ring Wheel, Segmental Wheel or Segments to adequately meet the condition.

Coarse grit, fast cutting wheels of the proper gradings to show high efficiency in stock removal.

Fine grit, cool, clean cutting wheels for accuracy and finish—wheels scientifically designed to reduce frictional heat—to prevent distortion of ground planes.

And the ultimate grinding costs and production on either type of operation depends upon a balanced efficiency—a proper relationship between the work and the wheel—in other words the right wheel in the right place.

In many cases the use of segments in place of the ring wheel is more economical. Speaking generally, segments of harder grades can be used and high efficiency obtained on production surfacing operations.

Wheels and segments are made in two types of abrasives, Carborundum Brand Silicon Carbide and Aloxite Brand Aluminum Oxide in vitrified "Redmanol" or rubber bonds to meet all conditions.

TUNE IN THE
CARBORUNDUM BAND
Saturdays at 9.30 E. S. T.
Columbia Chain

THE CARBORUNDUM COMPANY — NIAGARA FALLS, N. Y.

REG. U. S. PAT. OFF.

CANADIAN CARBORUNDUM CO., LTD., NIAGARA FALLS, ONT.

SALES OFFICES AND WAREHOUSES IN

New York, Chicago, Boston, Philadelphia, Cleveland, Detroit, Cincinnati, Pittsburgh, Milwaukee, Grand Rapids, Toronto, Ont.

(CARBORUNDUM AND ALOXITE ARE REGISTERED TRADE MARKS OF THE CARBORUNDUM COMPANY)

Fabricated Structural Steel

Lettings in Good Volume—New Projects Lower

OF a total of 28,300 tons of structural steel awards the past week, grade crossing elimination at Syracuse, N. Y., for the New York Central Railroad accounts for 12,000 tons, and a fertilizer plant at Port Arthur, Tex., 5100 tons. Plate awards totaled about 5000 tons. New projects of 12,500 tons compare with 16,800 tons last week and 9800 tons two weeks ago. Locks and dams across the Mississippi River at Winona, Minn., Lynxville, Wis., and Saverton, Mo., will require 6900 tons of sheet piling. Structural steel awards for the week follow:

NORTH ATLANTIC STATES

Marshfield, Mass., 100 tons, State bridge, to Boston Structural Steel Co., Inc.

Syracuse, N. Y., 12,000 tons, New York Central grade elimination, to American Bridge Co.; Walsh Construction Co., general contractor.

Rockville Center, N. Y., 110 tons, St. Agnes' Church, to August Bellon, Inc.

Holtsville, N. Y., 110 tons, building, to George A. Just Co.

Woodside, N. Y., 1020 tons, apartment building, to Klein Iron Works, Inc.

Gardenville, N. Y., 200 tons, State highway bridge, to Lackawanna Steel Construction Co.

Clermont, Pa., 130 tons, bridge, to Fort Pitt Bridge Works Co.

Pittsburgh, 125 tons, building, to Pittsburgh Bridge & Iron Co.

SOUTH AND SOUTHWEST

Biloxi, Miss., 200 tons, Coast Guard hangar, to Virginia Bridge & Iron Co.

Port Arthur, Tex., 5100 tons, fertilizer buildings for Mathieson Alkali Co., to Virginia Bridge & Iron Co.

Sagerton, Tex., 340 tons, State highway work, to North Texas Iron & Steel Co.

Snow Lake, Ark., 1050 tons, Missouri Pacific Railway bridge, to Stupp Brothers Bridge & Iron Co.

Fort Sill, Okla., 450 tons, building to J. B. Klein Iron & Foundry Co., Oklahoma City.

San Acacia, N. M., 125 tons, dam gates, to Kansas City Structural Steel Co.

Loving, N. M., 550 tons, chemical plant, to Virginia Bridge & Iron Co.

CENTRAL STATES

Chicago, Ill., 275 tons, sheet piling, to Inland Steel Co.

Quincy, Ill., 1500 tons, sheet piling for dam across Mississippi River, to Inland Steel Co.

State of Minnesota, 100 tons, bridge, to American Bridge Co.

Genoa, Wis., 1200 tons, lock No. 8, to R. C. Mahon Co.

Appleton, Wis., 100 tons, building, to Vulcan Mfg. Co., local.

Iowa City, Iowa, 210 tons, University of Iowa Fine Arts building, to Iowa Steel & Iron Co.

State of Missouri, 255 tons, highway bridges, to Stupp Brothers Bridge & Iron Co.

Osage County, Kan., 310 tons, bridges, to Kansas City Structural Steel Co.

State of Nebraska, 210 tons, highway bridges at Lincoln and Fairburg, to St. Joseph Structural Steel Co.

WESTERN STATES

Walsenburg, Colo., 100 tons, bridge, to Minneapolis-Moline Power Implement Co.

Livingston, Mont., 225 tons, bridge, to Wisconsin Bridge & Iron Co.

Boulder Dam, 375 tons, extension to Babcock & Wilcox building, to Consolidated Steel Corpn.

Los Angeles, 300 tons, Helms Bakery Co. building, to Consolidated Steel Corpn.

San Francisco, 400 tons, General Baking Co. plant, to Western Iron Works.

Davenport, Cal., 1200 tons, Santa Cruz Portland Cement Co. plant, to Columbia Steel Co.

San Francisco, 1500 tons, Trans-Bay bridge tunnel supports, to Columbia Steel Co.

Jefferson County, Ore., 180 tons, Deschutes River bridge, to Poole & McGonigle.

NEW STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

Albion, N. Y., 300 tons, addition to State hospital, bids Dec. 21.

Sonyea, N. Y., 500 tons, addition to State hospital, bids taken Dec. 13.

Philadelphia, 5000 tons, subway connection with Philadelphia-Camden bridge; bids expected this week on first section.

Philadelphia, 300 tons, library for Temple University.

Canonsburg, Pa., 115 tons, State highway bridge

Poland, Pa., 425 tons, State highway bridge.

SOUTH AND SOUTHWEST

Bardstown, Ky., 200 tons, building.

State of Oklahoma, 250 tons, bridge.

Grand Prairie, Tex., 175 tons, under pass.

CENTRAL STATES

Medford, Ohio, 150 tons, bridge.

Toledo, 900 tons, building for Libbey-Owens-Ford Co., revised plans.

Cleveland, 1200 tons, tank tops and trusses for sewage disposal plant.

Cleveland, 140 tons, miscellaneous structural material for sewage disposal plant.

Burlington, Ia., 1200 tons, Lock No. 18.

Rochester, Minn., 115 tons, State highway bridge.

Saverton, Mo., 2900 tons, sheet piling for dam across Mississippi River.

Lynxville, Wis., 2500 tons, sheet piling for dam across Mississippi River.

Winona, Minn., 1500 tons, dam across Mississippi River, Milwaukee Bridge Co., low bidder.

WESTERN STATES

Fort Peck, Mont., 300 tons, railroad bridge over Fort Peck dam; United States Engineer Office.

Sheridan County, Wyo., 125 tons, State highway bridge; bids Dec. 19.

State of Montana, 160 tons, bridges in three counties; bids Dec. 15.

Mendocino County, Cal., 280 tons, State bridge over Eel River; bids Dec. 27.

San Francisco, 500 tons, cranes for Trans-Bay bridge.

Fort Mason, Cal., 740 tons, extensions to piers Nos. 1 and 3; bids under advisement.

Los Angeles, 1135 tons, tunnel supports for Metropolitan Water District. Youngstown Steel Car Corpn., low bidder.

Seattle, 3561 tons, Railroad Avenue seawall; bids Dec. 21.

Mare Island, Cal., 175 tons, building.

Santa Ana, Cal., 175 tons, bridge.

FABRICATED PLATE

AWARDS

Manitowoc, Wis., 300 tons, light house tender, to Manitowoc Shipbuilding Corpn.

Stillwater, Okla., 175 tons, water tank, to Graver Tank & Mfg. Corpn.

New Orleans, 150 tons, miscellaneous pipe, to Kane Boiler Works, Galveston, Tex.

Boulder Dam, 1000 tons, five butterfly valves, to Hardie-Tynes Mfg. Co., Birmingham.

Boulder Dam., 2025 tons, drum gates, to Consolidated Steel Corpn., Ltd.

San Francisco, 1500 tons, tunnel liners on Trans-Bay bridge, to Columbia Steel Co.

San Diego, 300 tons, oil storage tanks for Navy, to Chicago Bridge & Iron Works.

NEW PROJECTS

Santa Cruz, Cal., 300 tons, two tanks; bids under advisement.

Los Angeles, 200 tons, boilers for Times Building; bids under advisement.

Washington, 750 tons, two Coast Guard cutters; Wallace Bridge & Structural Steel Co., low bidder.

British Pig Iron Demand Sustained

LONDON, ENGLAND, Dec. 12 *(By Cable).*—Pig iron is more quiet as home consumers' needs are now covered by contracts. Cleveland furnaces are heavily sold for some months, and more furnaces are expected to resume early in January.

Raw steel for prompt delivery is in short supply. Heavy steel is more active as the result of the flow to home shipbuilding yards and for construction and railway specifications

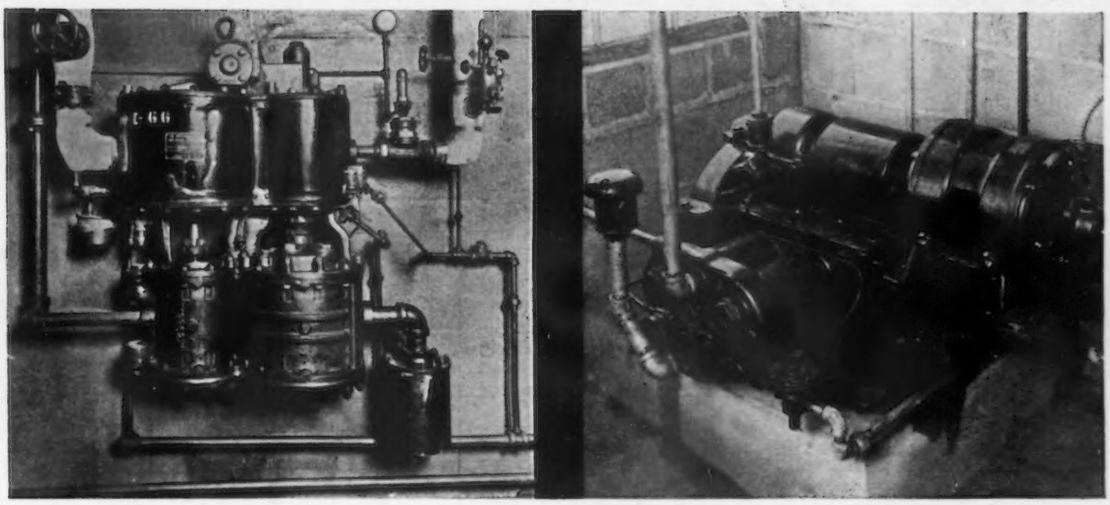
Tin plate is quiet as overseas buyers apparently are expecting to purchase United States products at cheaper prices. Welsh makers' bookings are below output, and a number of independent mills are likely to close unless demand improves in near future.

Overseas demand for Continental iron and steel is improving, with special interest by Norway, Holland, Japan and Manchukuo. United States competition is restricting South American business.

Richard Thomas has offered to purchase ordinary shares of Briton Ferry Steel at 30s. a share and to guarantee Briton Ferry Steel preference shareholders a 5 per cent dividend. The amalgamation of Vereinigte Stahlwerke Gelsenkirchen Phoenix and Van Der Zypen und Wissen concerns has been definitely approved by respective shareholders. The new honorary president is Herr Geheimrat Kirdorf.

Prices are unchanged.

WESTINGHOUSE AIR COMPRESSORS



FOR every conceivable pneumatic requirement in steel mill or industrial plant there is available a Westinghouse Air Compressor of suitable type and size—steam-driven or motor-driven . . . While there is diversity of form and purpose in these machines, there is a uniformity in quality and performance. They possess unique design features and are well built. Reliability, economical operation, and unusually long life are their outstanding characteristics.

WESTINGHOUSE TRACTION BRAKE COMPANY
Industrial Division - - - - - - - - Pittsburgh, Pa.

(9117)

JUST BETWEEN US TWO

We Joust Couldn't Think of It

THE gold, silver and bronze medals for the best advertisements in the Nov. 30 IA should be awarded thus, says T. J. Salow, Jr., of the Milwaukee Metal Spinning Co.:

Gold	Youngstown Sheet & Tube Co.	Page 99
Silver	Climax Molybdenum Co.	" 65
Bronze	Flinn & Dreffein Co.	" 88

Mr. Salow has the quaint idea that this column is intended to advertise The Iron Age, so he recommends that we call it, "JOUST BETWEEN US TWO." As Mr. Salow is the latest certified addition to the column's squad of readers, a better title might be, "Jest Among Us Six."

He Liked Two Others

Ralph H. Sweetser's candidates for the medals are:

Gold	The B. F. Goodrich Co.	Pages 74-75
Silver	The Schatz Manufacturing Co.	Page 73

He wants a special medal struck off for the editorial, "The Little Pig and the Three Bad Wolves," on page 11 of the Nov. 30 IA. Mr. Sweetser is a good picker. This particular editorial has attracted widespread attention.

Look Out for 'Em, Walt

INCIDENTALLY, we see that the intelligentsia are pinning medals on Walt Disney for his movie, "The Three Little Pigs." Careful, Walt, or they'll cramp your style. Look what they did to Chaplin. He made all his best pictures before they convinced him he was an artist, and hasn't produced a good one since.

It takes a good man to withstand the paralyzing effect of too much praise.

'Ale, 'Earty and Eighty

OUR masthead bears the legend, "Established 1855." So, in eighteen days we'll be in our eightieth year.

With a single exception (Dry Goods Economist), IA is the dean of trade papers. It can rightly lay claim to the ability to "take it." Long business life indicates a certain resilience, an aptitude for prompt adaptation to changing conditions.

If the shade of our founder, David Williams, happens to be in the Times Square sector on Jan. 2, the night the Annual Number goes to press, we hope he drops in. He'll see something that will give him especial reason to be proud of his brainchild.

An Orchid from Oldsmobile

ONE of the chief operating executives of the Olds Motor Works writes:

"I am a constant reader of The Iron Age and enjoy it very much."

It Seemed Funny to Us

A LIST an advertiser sent in for checking contained the name, "Wisconsin Steel Mine." Very comical, we thought, and gleefully showed it to the boys in the next office. But all they said was, "So what?" Which is why we sympathize with Ed Wynn even on his off nights.

Cease Worrying

IF you are tossing on your pillow night after night, worrying what to give a friend in the industry as a Christmas present, fill in this little coupon:

To The Iron Age, 239 W. 39th St., N. Y.

Send I.A. for a year to .....

.....

(Signed) .....

We will send you a suitable acknowledgment to tuck in his sock, and a bill for $6 to tuck in with your unpaid gas, telephone, doctor and coal bills.—A.H.D.

SCREENS of Perforated Metal

Metal of any kind *perforated to your order*

Grilles of many beautiful designs *see catalogue*

Safety Guards *see booklet*

Write for prices

The Harrington & King PERFORATING Co.

5657 Fillmore St., Chicago, Ill. 114 Liberty St., New York, N.Y.

THE CLASSIFIED SECTIONS *Have No Casual Readers*

When people turn to the classified sections of THE IRON AGE, as they do regularly, they mean business. They have something definite in mind and are looking for information. Tell them there what you have to offer in the way of contract manufacturing service, used equipment or business opportunities.